

In This Issue—A Study of Body Novelties

MOTOR AGE

MAR 11 1922

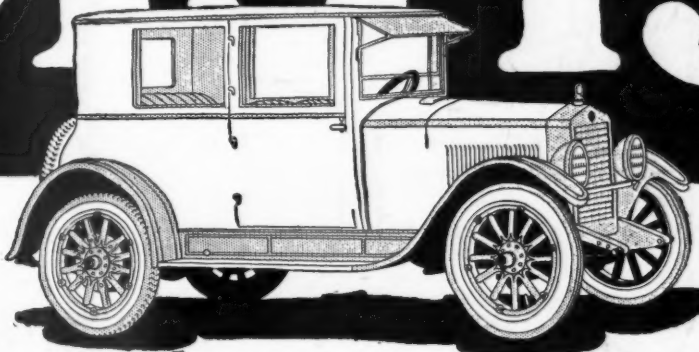
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CHICAGO, MARCH 9, 1922

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\$1345



Five
Passenger

Making Money for Dealers

Wouldn't You Like to Sell It?

This is the biggest closed car seller for years. You know why. An examination of its quality and a glance at the price tell the whole story.

It is the chief reason that Essex sales rooms everywhere are busy; and Essex dealers are selling cars on a profitable, forthright basis.

The Essex touring car at \$1095 is also an attractive offering that has much to do with the popularity of the Essex line. It is the greatest value among open cars from \$800 to \$1500. Buyers

know it, and Essex dealers profit by its reputation.

Essex production is mainly devoted to the Coach. It is the most popular Essex type ever produced. Quantity production assures prompt deliveries, and dealers do not lose sales because of inability to get cars.

You should see the Essex Coach, no matter what car you now sell. It may be the money-making opportunity you want.

If so write us—or see the nearest Essex distributor.



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BLACK & DECKER BENCH DRILL STAND

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STAND
WITHOUT DRILL

\$33.00

BLACK & DECKER
SPECIAL
HALF INCH
DRILL

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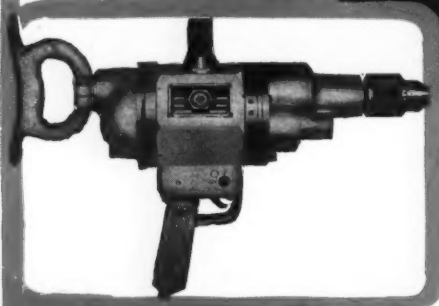
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DRILL STAND

with
BLACK & DECKER
SPECIAL $\frac{1}{2}$ " DRILL

COMPLETE AS
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\$118.00

The bracket supporting the drill may be raised or lowered to suit the height of the work and may be swung entirely around the post, which is a big advantage in locating the hole and for handling large jobs and odd shapes. The bracket is secured in position by means of a hand screw.



This is the new Black & Decker Special Half Inch Drill, which has created such a sensation in the trade by reason of the fact that it combines Black & Decker quality and an exceptionally low price.

YOU can always tell a good mechanic by his tools. He never buys inferior tools because they are cheap, if he can avoid it. But if he is a good business man as well as a good mechanic he guards against unnecessary expenditures.

In most shops a portable electric drill is absolutely indispensable and a drill press often necessary. Good mechanics everywhere are using Black & Decker Portable Electric Drills; and to make it possible for them to have the advantages of a drill press at minimum expense we have produced the Black & Decker Bench Drill Stand.

The Black & Decker Portable Electric Drill can be mounted in this stand in a few seconds and dismantled just as readily. The Stand sells for only a fraction of what it would cost to install a drill press.

The Black & Decker Post Drill Stand is similar in all respects to the Bench Drill Stand except that it has a longer column and is arranged with brackets so that it can be mounted on wall or post and the drilling table is secured on the vertical column with a hand screw so that it can be raised or lowered or swung around.

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BLACK & DECKER NATIONAL CREDIT SERVICE enables any reliable person in the United States or Canada to purchase BLACK & DECKER equipment on terms that will enable the equipment to pay for itself. You can purchase BLACK & DECKER equipment thru your own jobber at no extra cost for the long time credit.

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MOTOR AGE

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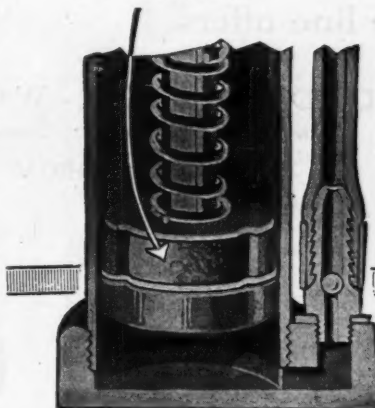
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Business
Getter
!**



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SELF OILING
WASHER**



Sell YOUR customers a pump that will give LASTING satisfaction. Most pumps are short lived because no dependable provision is made for keeping the valve leathers lubricated. Consequently, they soon dry out and crack. The MONROE PATENTED Self-Oiling Device entirely overcomes this great handicap. Even if a MONROE lays unused for months, it is ready for service immediately it is required. Because of this advantage—AND THE FAIR SELLING PRICE—it realizes quick, certain profits for you.

Write for details and prices

Monroe Auto Equipment & Manufacturing Co.
 Monroe, Michigan

Sales Representative: The Fulton Company, Milwaukee, Wis.

M O N R O E
Self-Oiling
T I R E P U M P

WHATEVER may be the particular taste of any individual, it is practically certain that one or another of the fourteen Oldsmobile models can entirely satisfy it.

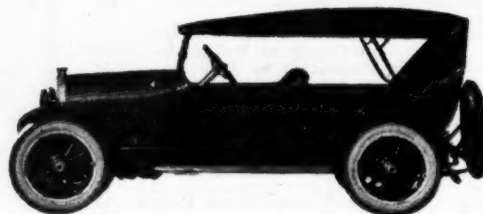
Furthermore, these Oldsmobile quality Eights and Fours sell at prices heretofore unknown in their respective classes.

What better sales opportunity can be presented to any dealer than that which the complete Oldsmobile line offers.

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Division of General Motors Corporation

LANSING, MICHIGAN



Model 46—8 Cylinder

Sedan	- - - - -	\$2635
7 Passenger Touring	- - - - -	1735
6 Passenger Touring	- - - - -	
(Wire or Tuarc Wheels)	- - - - -	1850
4 Passenger Pacemaker	- - - - -	1735

Model 47—8 Cylinder

Coupe	- - - - -	\$2145
Sedan	- - - - -	2295
4 Passenger Touring	- - - - -	1595
5 Passenger Touring	- - - - -	1595
4 Passenger Super-Sport	- - - - -	1825

Model 43A—4 Cylinder

Coupe	- - - - -	\$1645
Sedan	- - - - -	1795
5 Passenger Touring	- - - - -	1145
Roadster	- - - - -	1145
4 Passenger Semi-Sport	- - - - -	
(Tuarc or Wire Wheels)	- - - - -	1265

F. O. B. Lansing, Michigan

Oldsmobile
24th YEAR



MOTOR AGE

Use None but the Good Bricks



What a Successful Large Garage Has Learned About This Business

The Fifth Avenue Garage, Inc., Tells from Experience How to Avoid Some of the Pitfalls That Beset the Path of the Dealer and Garageman

How It Keeps Out of the Class of 'Just Another Garage'

By J. C. DORMAN

Manager of the Fifth Avenue Garage, Inc., Gary, Ind.

OUR business dates back to 1912, those pioneer days when about every few weeks a radical change or mechanical correction caused a depreciation of 50 per cent on the cars in stock. Just as this condition was improving, the hard times of 1913 and 1914 struck and forced upon us the realization that a considerable part of our charge business was not being paid for, and that when such customers were pressed for payment they ceased to be our friends.

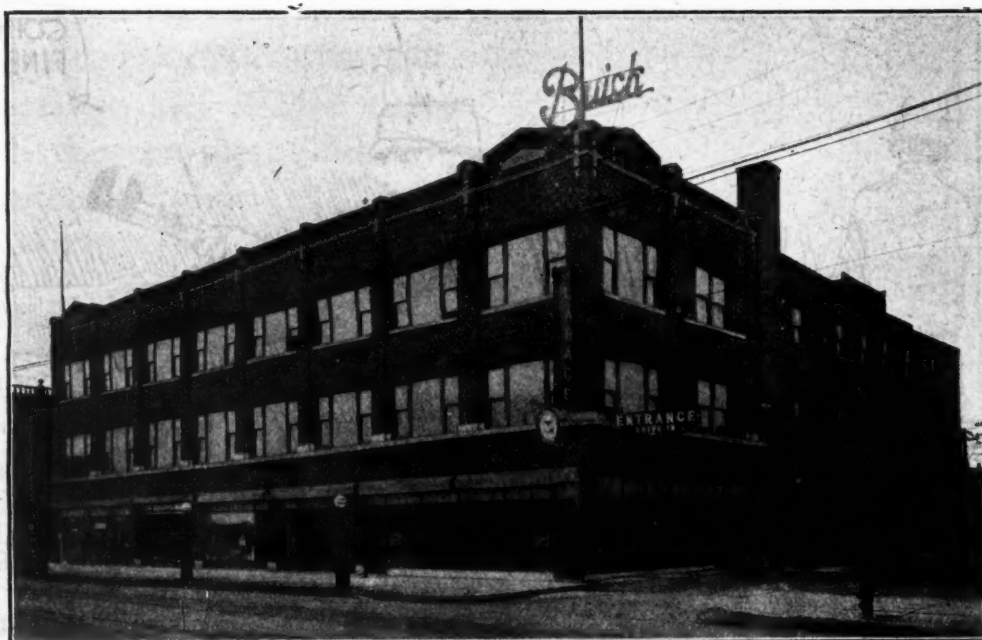
Right there, we established the rule which we believe will do much to keep the garage from being "just another"; namely, a customer must establish a satisfactory credit rating before being entitled to credit. It was costly experience to learn that success is not measured by the amount of business a firm does, but by how much of it has been paid for and how much it costs to collect.

We know of no reason why a dealer should not pick his customers as a banker or a dry goods merchant does. Just because a man has nerve enough to rush into a garage, order a couple of cord tires and act as if he owned a real gold mine is not sufficient reason to give him credit. We have been at the stage where everybody's word was good and we were afraid to turn them down fearing they would never come back. The result was the same old story, lots of business and at the end of our fiscal year all profit was charged off in bad accounts.

There are no geniuses in our firm, but we have set up certain principles, and as a result of being guided by them, we know that our business is looked upon as on an equal footing with banks, mercantile establishments and high-grade business houses. Organization is the key to the accomplishment. No man can, single-handed, conduct a garage. That garage where everything must be passed up to the boss and the employee is only a cog, is traveling fast on the road to failure.

We have studied garage conditions from New York to California, and this is the outstanding mistake that most garage owners are making. Their time is so taken up with minor details that they cannot supervise in a general way nor lead the organization into real improvements.

I have called at garages where it was difficult to find the owner. He was down in a pit greasing cars—working on a speedster to enter at the next amateur race or down-town playing pool. The customer who wanted to see him about a worth-while purchase was kept waiting until he grew dis-



The Fifth Ave. Garage, Inc., Gary, Ind., which, by adhering to strict business principles and co-operating with its employees, has gained distinction and prestige in its community

gusted and left. All businesses, and by that I mean garages, require supervision. Get an inexpensive man to grease your cars—an alert boy to pump gasoline and sell minor accessories. Have all the help your business warrants.

The owner or manager should spend his time in seeing that his customers receive service. See that you have competent employees and keep them competent. Keep your place of business in order and have it reflect the character of business you do. Employees must be encouraged to act upon their own initiative. They are standing between the business and the public; they are in a position to see many of the things that escape the employer's attention.

Getting the Employees' Co-operation

We believe that every employe in our organization has something in mind that we should know, and to learn what it is we hold weekly noon-day luncheons for department heads. In addition, twice each month, a club composed of employes and their families meets. At this time suggestions are discussed, an interesting lecture may be given, and there is a social hour.

The employe and his family go home realizing that he is more than a mere cog in the machinery, and that we are interested in his ideas and that we are doing our best for him. We are confident that this has done more for us than anything else could have accomplished in a time when employe and employer were drifting somewhat apart.

We are certain of this and I will relate one of the many incidents. The question of smoking in our building had always

J. C. Dorman, manager of the Fifth Ave. Garage, Gary, Ind., says the article, "Just Another Garage," from the Nov. 14 issue of *MOTOR AGE* ought to hang over the desk of every garage owner in the United States, and outlines on these pages how the Fifth Ave. Garage keeps out of that class.

been a source of worry. We fully realized the hazard connected with this habit and more important the waste of hours weekly by some thirty or forty men lighting and smoking cigarettes and cigars. We conceived the idea of starting a Fire Department among the boys and elected as chief the most habitual smoker we have. Then we casually suggested to him that he issue an order prohibiting smoking on the second and third floors. It was rather difficult for him to issue this order but he is a game fellow and took his medicine like a man. The results have been so completely successful that today when a man enters our shops smoking he is politely informed by one of the boys that smoking is not permitted. You know that such an order given men by the foreman would have been resented and they would have smoked in his absence.

Selling the Used Car Profitably

A third problem we have tried to solve is that of the used car. This, today, is the big factor in the sale of new cars. Many prospective buyers lose sight of what they are buying in their interest in selling their old car. We handle a standard make automobile that the public respects and wants. We have also built up a genuine service policy. If the customer is not convinced that our car, together with our service policy, is what he wants and is interested only in selling his old car, then we cannot do business with him. In other words, we believe that the customer must be sold on the article he is getting and not merely on the idea of selling his old car. If he is so convinced, we have a competent man carefully inspect his car, set down every article it will need and, after allowing a margin of profit, he is given credit on that basis.

When a prospective purchaser of a new car begins to talk trade on his old car we immediately get the history of his car as nearly as possible. This is necessary for we are buying his car the same as he is ours and the used car purchase must be given the same careful consideration.

Every car we take in must either be junked or rebuilt and sold at a profit and at a price attractive to the buyer. We do not guarantee any used car sold by us but allow seven days trial, during which the customer may, if dissatisfied, bring back the car and have his money returned with no questions asked. By these methods we prevent the used car business from degenerating to a "game."

Two years ago, when new cars were unobtainable, we purchased hundreds of used cars, rebuilt them to the best of our ability and sold them to buyers who today are among our best customers.

This experience taught us that the used car business is profitable if you give the people their money's worth. Have the used car in good condition instead of stinging your customer just because you had been over anxious to make a deal and were left with a used car of inflated value on your hands and you were compelled to pass the burden along to the other fellow who couldn't afford a new car.

Course of Instruction for Owner

By enlisting the cooperation of the factory branch of the automobile we sell we were able last winter to conduct an automobile school of instruction. Invitations were issued to all automobile owners, prospective owners, and friends. The school was held every Monday night in our salesroom. Lecturers who were practical as well as theoretical were secured. Each lecture dealt with individual topics. One evening lubrication would be gone into—the next fuel—and so on until the entire field had been covered. The enthusiasm shown and the class of people attracted was remarkable and the results obtained were far beyond expectation.

Each month we issue bulletins to our owners. These are

in the form of a personal letter and deal with the care of their cars. In the November letter we asked that they call at our service station and have the carburetor adjusted for winter driving and suggested the proper lubricants for winter use. In December we warned them against the possibility of freezing the motor and the care of the starter in extreme weather, January the care of the battery against freezing and the need of radiator protection. The February letter which is just in the mail is on the preparation of the car for spring driving. These letters are welcomed by our customers as a guide. While the service is free it keeps us ever before the owner and in 80 per cent of the cases we sell the seasonable accessories.

As has been the custom of all automobile sales organizations we have always given our owners service. This term, ever since it has been applied to the automobile business, has been very vague—both to the dealer rendering the service and the customer who receives it. "Servicing" cars with us dates back to 1912. As our organization grew our service expanded and each year our policy was more liberal. This is the outstanding feature on which we have built our business—Service. Service intelligently rendered at the smallest possible cost.

Service on the New Car

We have now perfected our service so that we are able to offer six months' service on each new automobile we sell. This is not a selling promise only to be forgotten when the owner goes to realize. We give with each new car sale a "Six Months Service Guarantee" which means that we no longer side-step the biggest thing that enters into an automobile purchase. The common practice of ignoring the owner as soon as he purchases his car must cease. Your best salesmen are your owners, without their help your sales resistance is so strong sales are nearly impossible, so in order to convince the owners that they do get this service we give this certificate of guarantee with each car and then live up to it. We have found this method of increasing sales very satisfactory.

A great many garages have a stock of merchandise of some unknown brand stowed away in some corner covered with dust, while the owner contends that business is poor. There are probably very few garages that have not a large stock of some



Do You Get the Big Idea Here?

As photographs go it's not so startling, just an ordinary snap of a crowd of boys and girls enjoying an afternoon's outing but the big idea is the good fellowship that has been engendered by the Fifth Ave. Garage among its employees as a result of staging these little holidays. The whole bunch and their families get together like this two or three times a year and go back to work the next day with a vigor that more than offsets the time required for one of these morale building and loyalty preserving excursions

accessory bought chiefly because the exclusive selling rights or a big discount could be had if bought in large quantities. This practice is as perilous as poor credit and is one of the reasons why, when a garage is sold at auction, it usually brings about 15 cents on the invested dollar.

How We Buy Stock

If the dealer would buy staple articles, things the people are asking for, and not overbuy, he would turn his stock quickly at a nice profit. Too often, however, he gets interested in one article, buys enough for the whole country, and with capital exhausted, has to close his doors.

We have made a careful study of the accessory business and have developed it into one of our most successful departments.

We are making profit on every article we handle because our stock is only standard merchandise. Articles the people are asking for, regardless of the possibility that we might make larger profits on unknown goods, are all that we have in stock. We are content with small profits on a large scale, instead of large profits on an uncertain scale.

It is to be hoped that within the next five years the garage business will be lifted to a higher plane. If we are to enjoy a credit rating on the same scale with other merchants, we must convince the banker that we are real merchants and not merely trying to operate a business without knowing how or why.

We must learn what to handle and, what is more important, what NOT to handle. Nothing will cause a banker to desert you quicker than to have him learn that you have overbought and must stand a large loss on declining markets.

There is no better way for us all to be enlightened than through the industry's business magazines. There is not a single issue of any such publication that does not contain some article which, if applied as prescribed, will help us to be something more than "just another garage."

I am proud and glad to be in a line of work with so much opportunity. My only regret is that more people in it do not feel they have the time to study conditions and thus become better business men—a credit to themselves and the automotive world.

Simple Method of Keeping Service Records

MANY of the smaller service stations and shops in the country are looking for some simple system of record keeping for their service work and especially those records which will be of use in determining a flat rate price on any given repair operation. On this page we show cards which are made use of in a simple system devised by Roy Howard, Vancouver, B. C., and used in his service station.

These cards are conveniently kept in a small file and may be located at a moment's notice, showing complete details of every job that has been done.

The work card on one side contains the customer's name and address, as well as his car number, name of car, date, and repair operation or operations to be performed on the car. On the other side is given the mechanic's number, hours, rate, and material. The other cards, as will be noted, list the frequency with which a certain operation was performed in the shop, in this case, relining the service brakes. There is, therefore, a complete record of the number, labor, cost, etc., of this job and in time an average price can be established which would indicate the flat rate to be charged for the operation.

A complete history of every car is kept on a card, as shown. This checks up

with the data on the other cards and there is, therefore, a ready means provided for ascertaining at any time any

information the service station may require on the jobs that have been performed.

WORK SHEET				
Owner	E Jones		Address	546 Main St
Car No.	546	Quick	Date	Jan 15
Reline service brakes				

Work sheet listing nature of repair operation to be performed

TIME AND MATERIAL						
DATE	Mech. No.	Hours	Rate	TOTAL	MATERIAL	
Jan 15	2	4	1.25	5.00	2 x 3/16 Brake lining	7.50
" 15	3	1/2	1.00	50	Rivets	25
				\$5.50		\$7.75

Reverse side of work sheet listing labor and material

NAME	ADDRESS	
E Jones	546 Main St	
Car	Number	Type
Buick	546	D 45
Jan 15	Reline service brake	
Jan 20	change oil engine	
Feb 5	Grind valves	

JOB	Rehine Service Brake			
CAR	Buick	TYPE	D45	
DATE	OWNER	LABOR	MATERIAL	TOTAL
Jan 6	A Smith	6.25	7.75	14.00
Jan 15	E Jones	5.50	7.75	13.25
Jan 30	B Brown	7.00	7.75	14.75

Left, history card of car, showing service operations performed. Right, card useful in determining flat price to be charged for given operation

Have You Tried to Sell a Tractor as a Transportation Unit?

IT IS a good field to practice on as training for tackling the farmer, who is the champion hard hitting buyer.

THE tractor as a plowing power machine is quite well known. As a general power plant for the farm it is less well known.

As a general heavy duty transportation power plant, it is even less known.

There is little question but that a great future awaits the tractor as a transportation power plant. It is used today in many ways to the great profit of the owner. Tractors are now seen on the city streets and do not attract much attention, chiefly because they are in an entirely utility use and the people who see them realize that the machine, however unfamiliar it is, must be common because it is doing such common work.

Doubtless every automobile dealer in the country recalls the cry of dismay that greeted the Ford action of shipping tractors to every Ford dealer in the country. Ford dealers in the cities, who had never sold even a Ford car to a farmer, were nonplussed, mystified and some of them angry. But they put the Ford tractor on view and made some sales.

Undiscovered Utility of the Tractor

Then, after a period of study of the situation, things began to happen. Dealers who had tractors and no farms in their territory began to think. Necessity has always been the mother of invention. The investment in a Ford tractor was the necessity. Invention began on the uses the tractor might be put to. Rubber tires, both solid and pneumatic, were fitted on tractors to make this machine a reliable indoor performer and they found their way into basements, and other unexpected places.

Two years ago a manufacturer of the crawler type of tractor was surprised at the orders he was receiving from some of his city dealers and he investigated and to his amazement learned that about 10 per cent of his products were going into industrial uses. The crawler type was especially favored for switch-engine purposes in private railroad yards because the tracks presented practically no problem for the movement of this type of machine.

On the following pages are presented in pictorial form some industrial uses of the tractor. These do not by any means exhaust the list, indeed it is only the merest suggestion of the possibilities.

In this year of 1922 every dealer in the country is looking for all of the business that he can get. It is a period when the automobile dealer can well shape his affairs to become an automotive merchant in all that this phrase should mean. Especially in the smaller cities he should so arrange his affairs so that he can sell the transportation that is needed for that community. This transportation may be a passenger car, a truck, a tractor, or a motoreycle.

Cutting the Cost of Farming

If you see the need of personal transportation, why not get busy and sell the thing that meets that need. Every vehicle put out should be another customer for the service department.

Another service department tip is to keep track of your near relative, the farm light plant.

But this article was primarily on the subject of tractors. The tip is out that a considerable number of farmers have some money in the bank despite the poor prices of farm produce during the last year and that these farmers are thinking seriously over the question of cost of producing crops. They are thinking seriously and much to the point as to the equipment needed for lowering this cost. The man who studies up on the tractor question stands a very good chance of making some sales, but the "power farming" is one that requires real study, but it has been profitable to the men who have gone into it. Practice on the lighter question, that of selling tractors for transportation of freight and get in trim for meeting that heavyweight buyer—the farmer.

There is money in tractor sales and there is no need of waiting for a farmer to come into the store to sell the first one. Perhaps the sawmill in your town needs a machine that will haul logs, lumber and supply power on alternate days. Just give your community the once over and study every phase of the transportation it presents, then cash in on your study.

Iowa is often presented as the most completely motorized state in the union. Here is an analysis of Iowa as prepared by Dave Darrah of the Hart-Parr Co. It was presented to the Iowa Motor Trades Bureau a few weeks ago. Look over your territory and see how your chances line up.

Statistics of Purchasing Power

In Iowa, one out of every five and a half people owns an automobile. On the farms of Iowa—remember there are 204,000 farms—there are today 171,575 automobiles, leaving in round numbers 32,000 to be sold before all the farms are automobilized. Now, get that. The farmer today has a mighty big proportion of automobiles—171,000 plus, leaving but 32,000 farmers yet to buy—not counting replacements.

Let's step down to trucks. Remember—204,000 farms in Iowa. There are today 10,788 trucks in operation upon the farms of Iowa, which means one for every 18 farms, leaving you men 17 out of 18 farms yet to sell trucks to.

Farm lighting plants—I wish you could get into that East country again. I ate dinner in a farmhouse over there which is 121 years old and as straight and strong as it ever was—as this room is—and yet thoroughly equipped with electric lights—not alone in the house but in the barn and an electric motor to do a large proportion of the work. That is coming to the farms of Iowa some day. On our 204,000 farms, 25,000 farmers have lighting plants, or one out of every 8 farms today in Iowa has a lighting plant.

Tractors—204,000 plus, farms. There are 22,319 tractors or one for practically every ten farms. Something like 182,000 farms yet to be motorized for power farming in the state of Iowa.

This Dealer is Right on Service

The Garber-Buick Co., Buick dealer in Saginaw, Mich., has a letterhead on one side of which is the familiar Buick slogan, "When better cars are built Buick will build them."

On the other side to balance it is something equally important to the car owner. It is this, "When better service is given Garber will give it."—A. S. A. Bulletin.

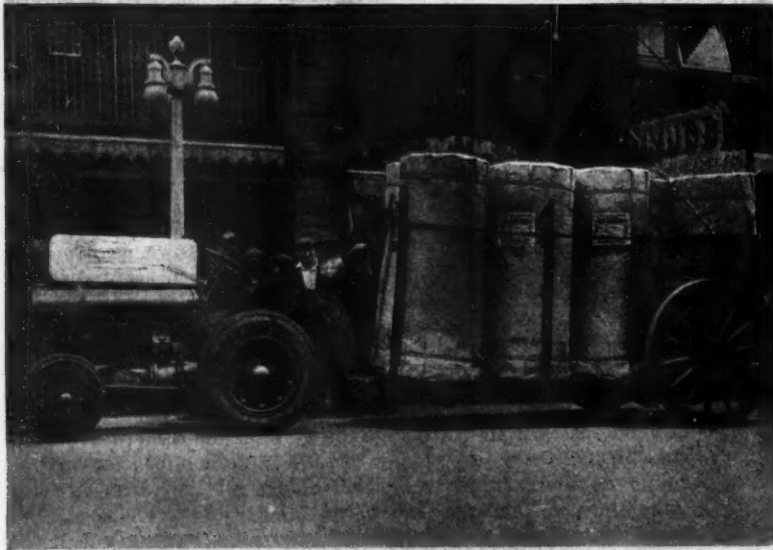
THERE ARE OTHER USES FOR TRACTORS BESIDES



Cletrac at work in a foundry



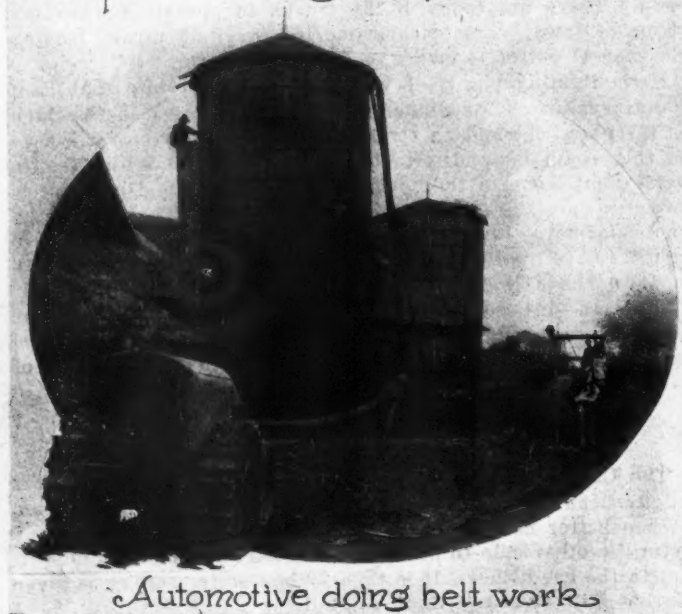
Hart-Parr operating a saw-mill



Fordson doing heavy trailer work



Avery Road Razer grading highway

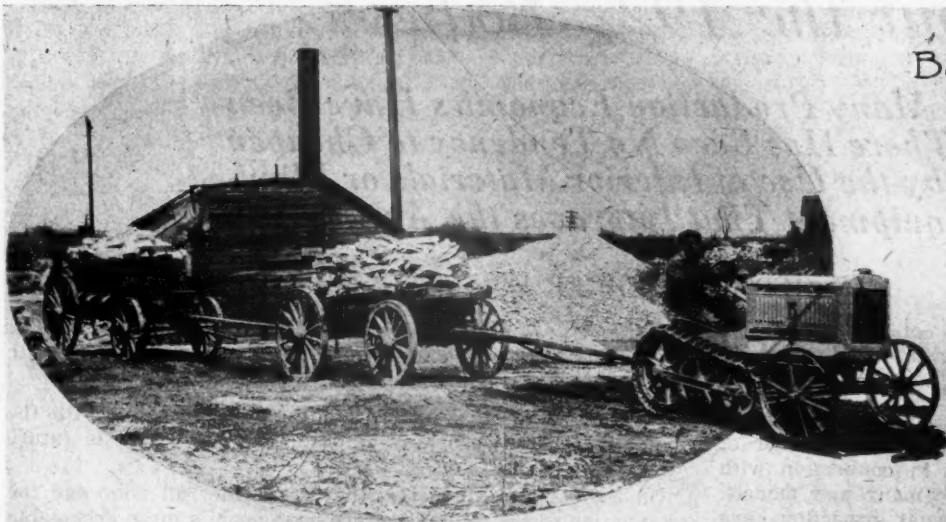


Automotive doing belt work



Toro tractor propelling multiple lawn mower

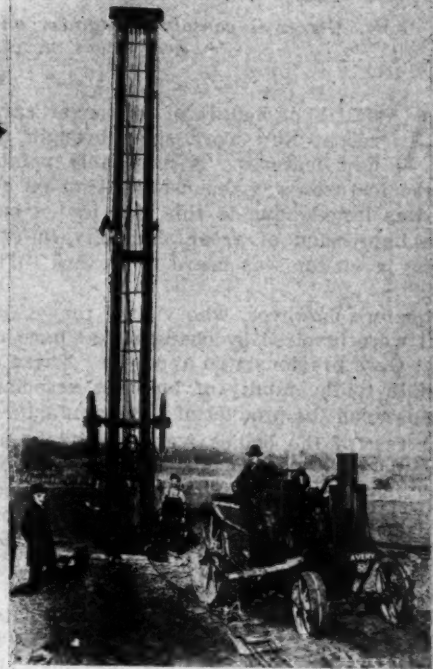
PULLING A PLOW—A TIP FOR GREATER SALES



Bates Steel Mule
hauling stone



Case mining surface coal



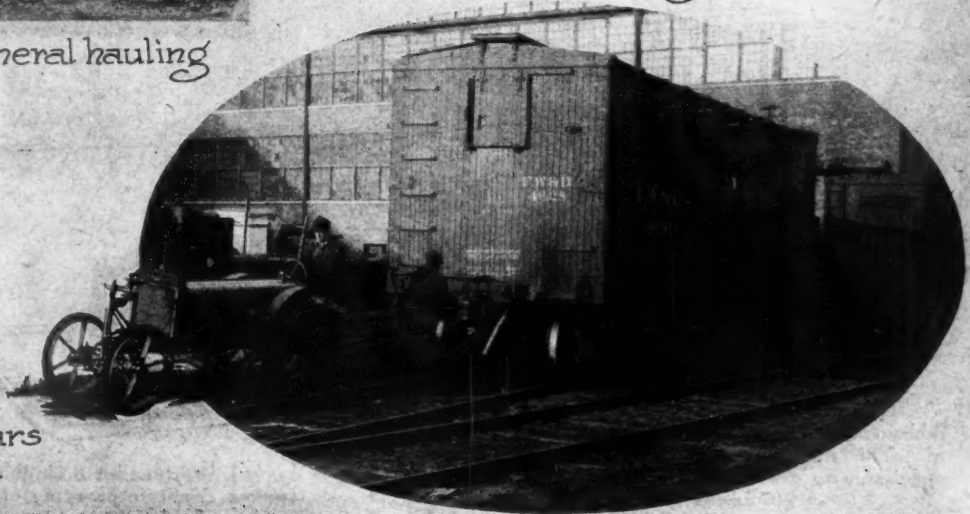
Avery tractor pulling oil well casing



Cletrac doing general hauling



Fordson pulling load and trailer



Avery shunting cars
in factory yard

Some Things the Dealer Should Know About the 1922 Bodies

THOUGH Many Production Economies Have Been Effected There Has Been No Tendency to Cheapen Construction by the Use of Inferior Materials or Eliminating Any Equipment That Improves the Appearance

By GEORGE MERCER

Mr. Mercer is consulting engineer on automotive body problems. He was one of the pioneers of the industry, coming to it early from the carriage field. This article was prepared for Automotive Industries.

A STUDY of details of passenger car body designs at the recent New York show brought to light a number of new features. A noticeable point in connection with these features was the use of them on so many new models. It was largely due to this fact that a casual inspection gave the impression of great similarity in construction. In fact, many a visitor was heard to remark, "They all look alike to me."

Dealers, however, who visited the exhibits of the cars they sell were inspired by changes that have remedied some faults that were previously so apparent. These changes were clearly visible to the family of business associates whose living depends upon the product of the manufacturer.

A few of the bodies were absolutely new and were shown for the first time as a manufacturer's model. One of these was the inside driven cabriolet—exhibited by Lincoln, Vauxhall, Stevens-Duryea and Roamer. All of these models were good examples of body work. The inside driven cabriolet is new in a few respects only. It has been used on British cars for many years, but until recently failed to find favor in this country. The changes made to adapt it to the American market included removing of the collapsible roof feature. To the casual glance, however, the principal characteristics of the collapsible roof are retained, the most noticeable of these being the outside joint at the rear quarter.

The question naturally arises as to the need of retaining features that do not add to the usefulness of the body and are, therefore, an unnecessary expense. It cannot be denied, however, that the retention of some of the original features, although not actually necessary, do add to the exterior appearance and balance of the design. Not all bodies shown made use of the joint, however, since its use necessitates omitting the window in the quarter or else making it very small. The advantages of the larger window are apt to outweigh the

style appearance that the use of the joint conveys, with the result that it will probably be used to a less extent in future designs.

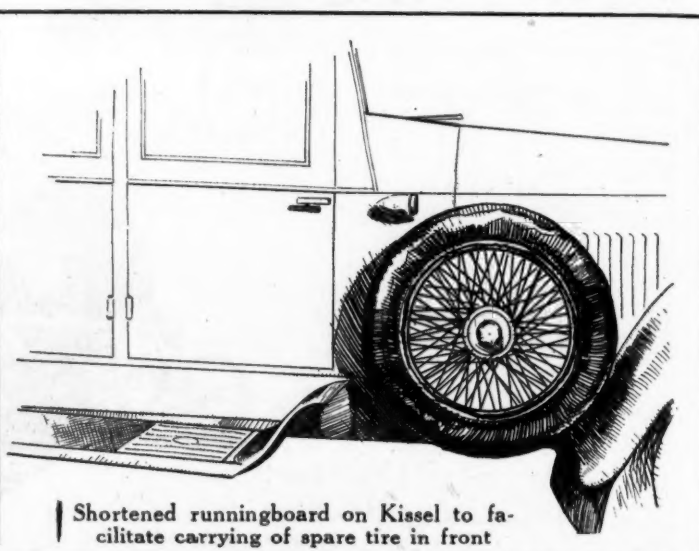
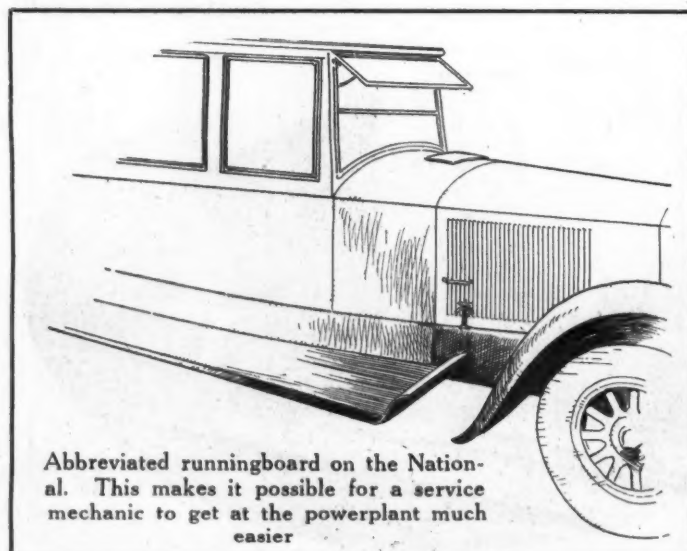
On these bodies, however, the use of the full door and the elimination of the folding feature have made a more acceptable body for the American public. This feature eliminated means less rattling and a longer life to the leather or fabric covering the top.

Another new feature of 1922 models is the close coupled body, of which the Jordan and Maxwell are examples illustrated. This design is one that will probably find increased favor as time passes. It is intended to meet the demand of the buyer who is not satisfied with the rather cramped seating accommodations offered by a coupe and who is not willing to have as large a body as the regulation sedan. Others exhibiting this type of body were Stanley, Paterson, Earl, Essex, Peerless, Cole, Stearns, Franklin and LaFayette.

The majority of these bodies had two doors, with the front seat made in two sections, the right one being made to swing about for access to the rear of the car. Several had the driving seat made to fold, to permit the occupants to get out from the left side in case of emergency. A few of these bodies had four doors, as shown on the Maxwell.

These bodies have an advantage in seating over the average coupe, because the rear seat is built straight across. In fact, the seat accommodations are the same as the sedan, but closer set up, and some of the manufacturers advertise them as sedanettes. Essex uses the name coach, and there are some other appellations given the design.

It might be asked why the body standards committee of the S. A. E. did not clean up the matter of naming this model. Their reason probably lies in the fact that time will be required to sift it into more sharply contrasting lines and that,

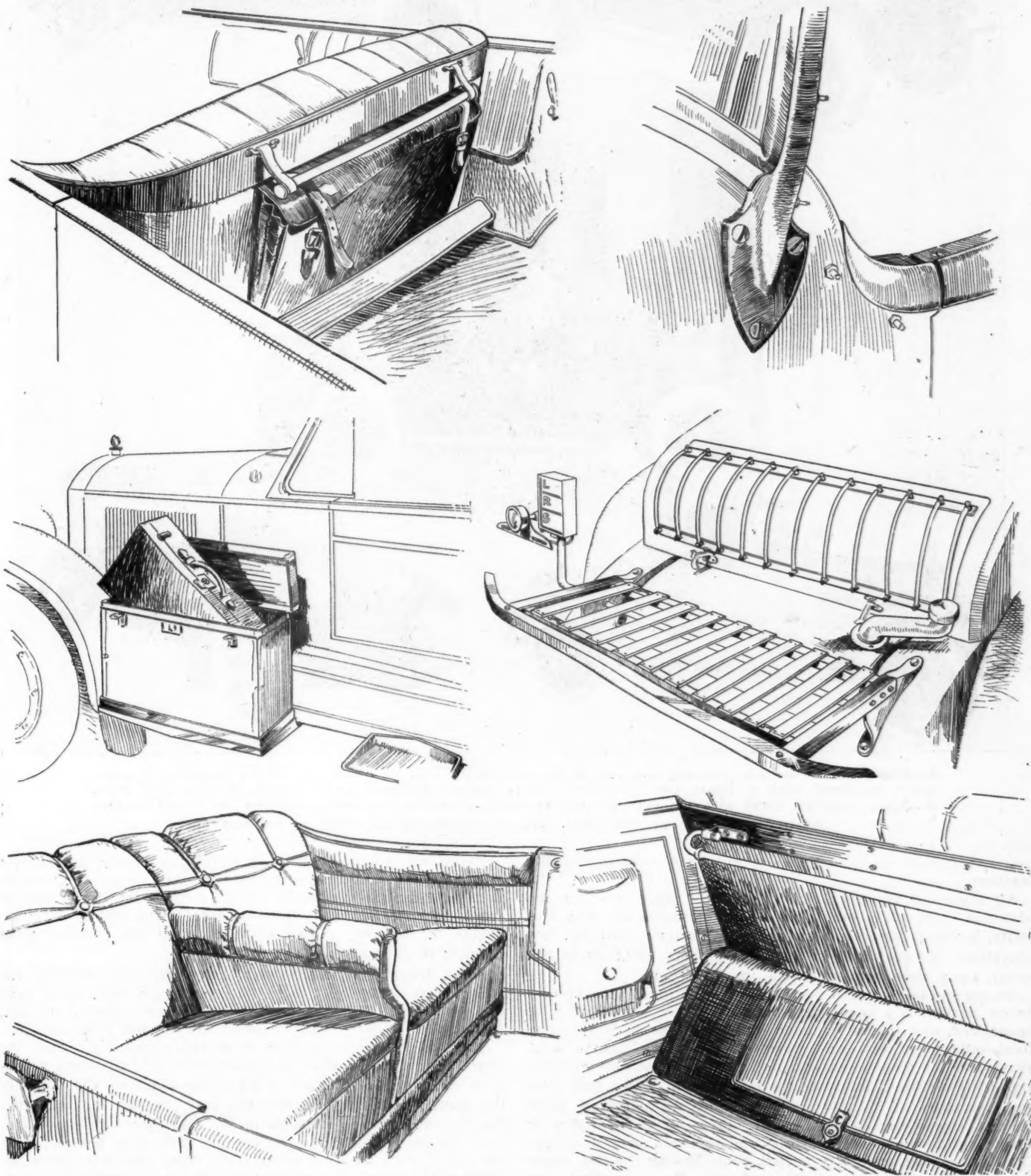


for the present, it will be best considered as belonging either to the coupe or the sedan class. With the two doors it belongs to the coupe and with four doors it will be nearer the sedan.

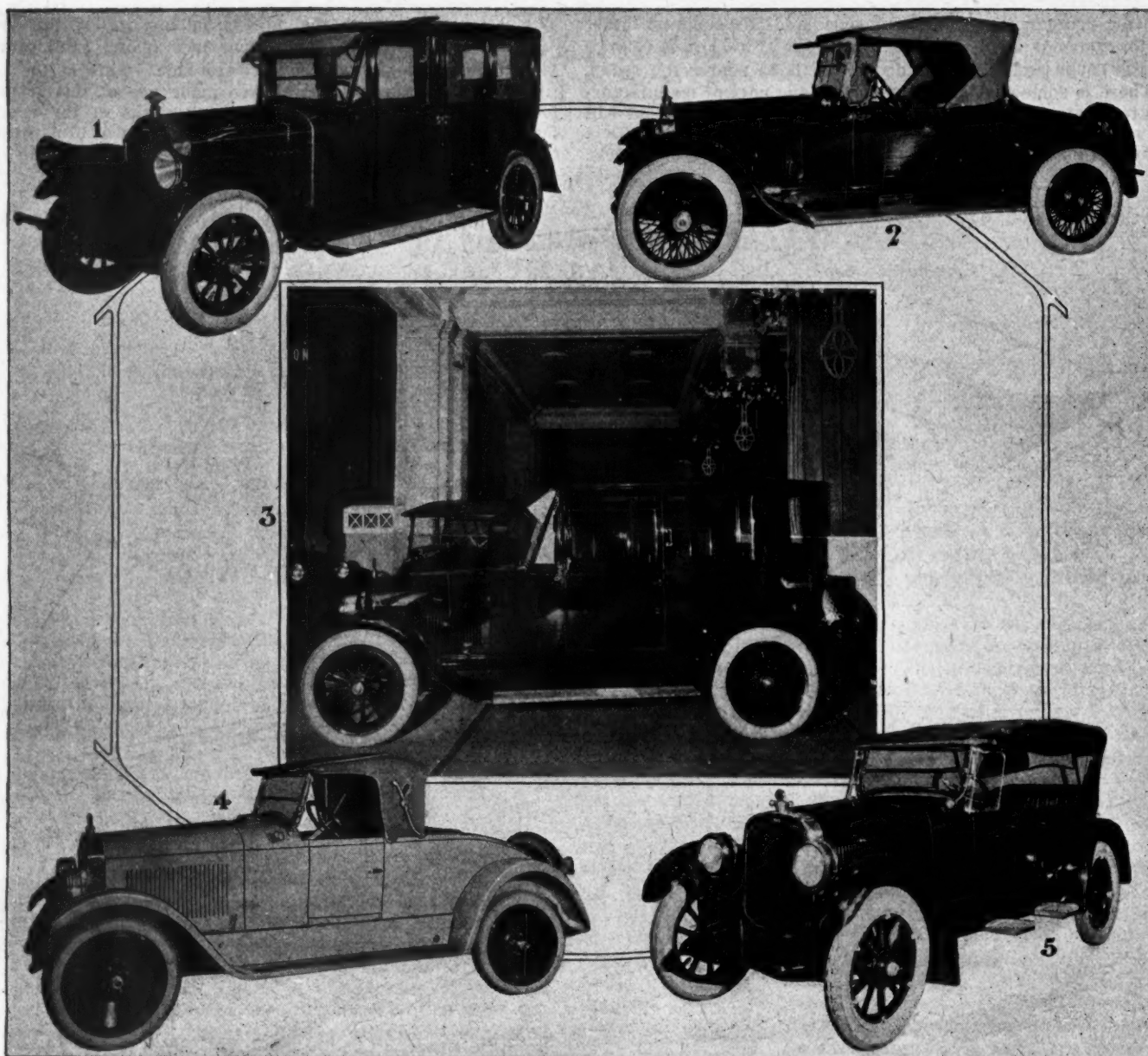
There is somewhat of a tendency on the part of manufacturers to create a low-priced, durable service model body that will be acceptable as a closed body for business purposes. Dort showed this type in both the four- and two-passenger models.

The latter is probably the most sensible size for this type.

There was a rather general tendency among exhibitors to place the spare tire at the forward side. This is the first time that quantity-built cars have made use of this location for the spare tire. Addition of trunk racks at the rear is largely responsible for the change. The two illustrations, one of the Kissel and the other of the National, show the run-



(Upper left) Lexington method of storing storm curtains on back of front seat. (Upper right) Base of windshield bracket on Chalmers. The fastening bolts are easy to get at for tightening. (Center left) Auburn suit case carrier, of rather unusual construction. (Center right) Trunk rack on Leach, made of polished hardwood strips on a metal frame. (Lower left) The rear seats on the Itala are permanently divided. Note also the decided rake to the seat backs. (Lower right) Itala box foot rest, combining also the services of a locker



1—Pierce-Arrow berline, a good example of the slant front type of body. 2—Buick roadster, a semi-sport car fitted with a khaki top. 3—The Jordan coupe, featured by an extraordinary wide door. 4—Moon roadster, fitted with a novel top, yet one which allows easy entrance into the car. 5—Chandler phaeton featured by rounded lines. No running boards are fitted on this model

board shortened to permit the carrying of the spare tire in this position.

All styles of trunk racks were used. Some were of the platform type, while others used the folding rack. The majority, however, used the stationary slat design. With but few exceptions, the rack and the guard rods were nickel or bright metal, wood slats forming a base for the trunk.

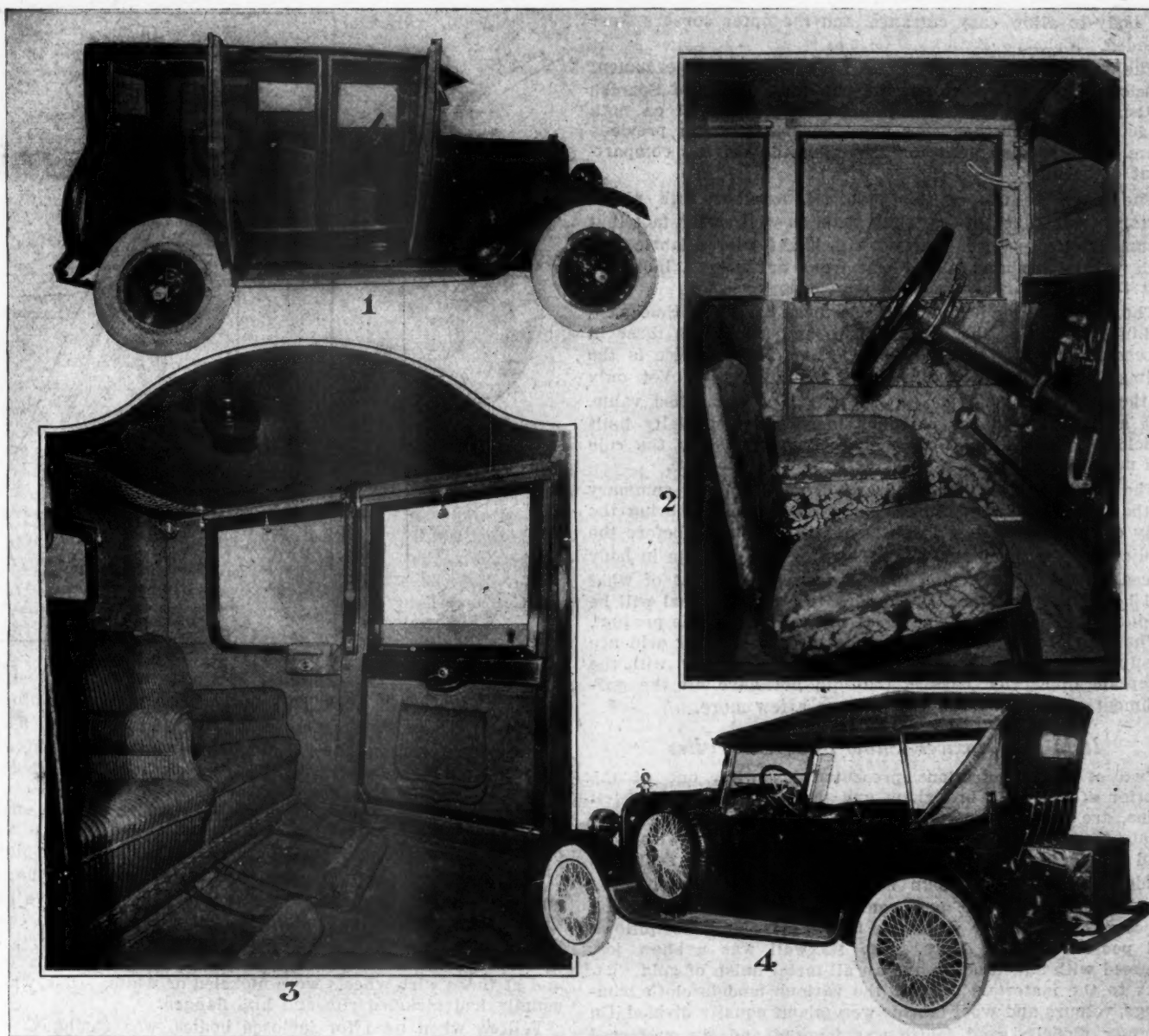
Among the larger sized bodies shown, the illustrated Pierce-Arrow berline is a good representation. The slant front may be noticed, and this is common with this type of body. The slant pillars on this body, however, are much lighter than usual, and the front is exceptionally light and attractive looking. This picture also shows the fabric visor, which was used on a majority of the cars. There were a variety of visor designs. Some were painted metal, others metal covered with fabric and in some cases fabric was fastened over a frame. The finish at the ends also varied, some having the flat panel supported by brackets and others having the ends closed by the fabric, as shown on the Maxwell and the Jordan.

For appearance, the last two named are superior. There is a more complete and finished look to these than to the type having open ends and supported by brackets. There were a few glass visors, some being painted, while others had the frosted finish.

Exterior features of inclosed bodies, generally, harmonized with the best characteristics of last year. The single wide belt molding, the ventilator top of shroud, the lower part of windshield stationary, the use of dash lamps and a slight increase of the use of the soft roof were the predominating features on new models.

Some doors were made flush, some with the overlap and others with moldings. More outside hinges were used than the concealed. The straight bar handle was general and this was divided about equally between nickel and black finish.

There is a lack of uniformity in the manner in which the doors on inclosed bodies are made to open. On open bodies it is the general practice to have the hinge at the front of the door. On inclosed bodies the best practice for satisfying the largest number of users is for four doors to open with their handles together at the center. Two-door bodies, as on the coupe, give greatest satisfaction when the doors have the hinge at the front. Five of the close coupled bodies at the show had two doors. Four of these were hinged at the front and one at the rear. Of the four-door type four bodies had the doors open with the handles at center and one had doors hinged at rear. From these examples it would seem that the newer bodies have a tendency to be more uniform as to methods of hinging.



1—The Maxwell coupe, an example of good coachwork. 2—Interior of Maxwell coupe carried out in a rich plum colored material. 3—Interior of the Itala, showing the divided seat and hassocks. 4—Lexington phaeton, which carries two spare wire wheels and a convenient touring trunk at the rear

Nickel was more generally used this year than ever before. Approximately two-thirds of the exhibitors had one or more cars with all-nickel or nickel-trimmed headlights. One-half of the cars with nickel headlights had nickel radiators and there were three with gold plate.

Nearly all the headlights were the drum shape—dash lamps corresponded in pattern to the headlights. Windshields on open cars were also quite often trimmed with nickel.

The illustration of the windshield foot on the Chalmers shows the tendency to change the method of attaching the shield to the shroud on open bodies. This is due to the prevailing round lines on radiator, hood and shroud. The illustration of the Chandler phaeton shows one of the new body designs in which the round lines of the front are well carried out.

This body carries the convex on the body side and the top edge of the body is drawn in. The rounding is taken from the body thickness and the top edge is thinner than usual and rounded over. One other feature on this body was the use of flush ventilators, which is an improvement over the conventional type. As shown, the shield has side wings. These wings were well represented and there is evidence that thought is being concentrated along the lines of developing improvements in open car windshields.

The illustration of the Auburn shows a new design side wing

that is an integral part of the shield. The Leach used a shape that is similar to that used by the Paige, and some others attempted to make the shield side arm nearer perpendicular at the rear. This was done to facilitate the fastening of the storm curtain, the idea being to accomplish this object at less expense.

The problem of storing the storm curtains on phaetons has occupied the attention of some designers. In some instances a space in the back of the front seat has been utilized for this purpose. The illustration of the Lexington shows one way that this locker space may be covered, the bellows pocket being so arranged as to cover a recess in the seat-back. Others use a natural wood finish door; in fact, the rear of the front seat was quite often finished with wood and had small locker space above the curtain pocket. The use of wood on open bodies was used to a considerable extent as a covering for the top edge. It is advantageous to have some protecting edge to the top of the doors on these bodies, because in opening and closing the doors, as well as at other times, the hands of the occupants of the car rest upon this surface.

The illustration of the Itala body shows a box footrest. This was seen on several cars. On the one illustrated it was used to contain the storm curtains, but generally it formed a toolbox. It was made both as a separate unit and as a part of the seat-back. It was generally shorter than the width of

the body to allow easy entrance, and the outer corners were rounded.

The rear section of this same body shows the permanent division of the rear seat and the trimming design of Spanish leather. Use of this leather for trimming material on both roadsters and phaetons was more general than in previous years. It was also used for trimming the driving compartment of berlines.

The extensive use of this material, together with nickel parts, increased use of the trunk rack, as well as the fact that a number of cars were equipped with khaki-colored fabric tops with wood bows and nickel slat irons or sockets, indicated that the sober car has taken a temporary recess.

The body builder is now, and has been for some time past, making one dollar the equal of two and sometimes three in purchasing power for his product. Low selling price is the ultimate goal of practically every manufacturer. Yet only in the service car do we see the effect of cheapened value. The standard body has as much merit as a specially built article. Good workmanship and good material are the rule and more of the ornate is to be seen than ever before.

The deduction that can be drawn from the above summary is that the car manufacturer, strive as he will to bring the body cost to a new low level, is not willing to go before the public with an inferior article. Therefore, the bottom in body prices sought is something that is desired in excess of what will be actually attained. The effort to reach the goal will be productive of results, but never at the sacrifice of the product.

The interiors of the inclosed bodies present further evidence in support of this summary. There was not a body, with the exception of service models, that did not have all the garnishment of former years and perhaps a few more.

Itala and Maxwell Show Body Flourishes

Two of the illustrations presented herewith, one of the interior of the Itala brougham and the other of the Maxwell coupe, are examples of this fact. Both, however, were more ornate than the average. The former was trimmed with gray wool fabric having a fine black stripe. The rear seat was divided and the trim design was plain. The wood trimming was Circassian walnut and vanity cases were made of the same material. There were also toggle grips and foot pillows and pockets on the doors. The Maxwell was a show job, trimmed with silk brocade and an all-metal finish of gold.

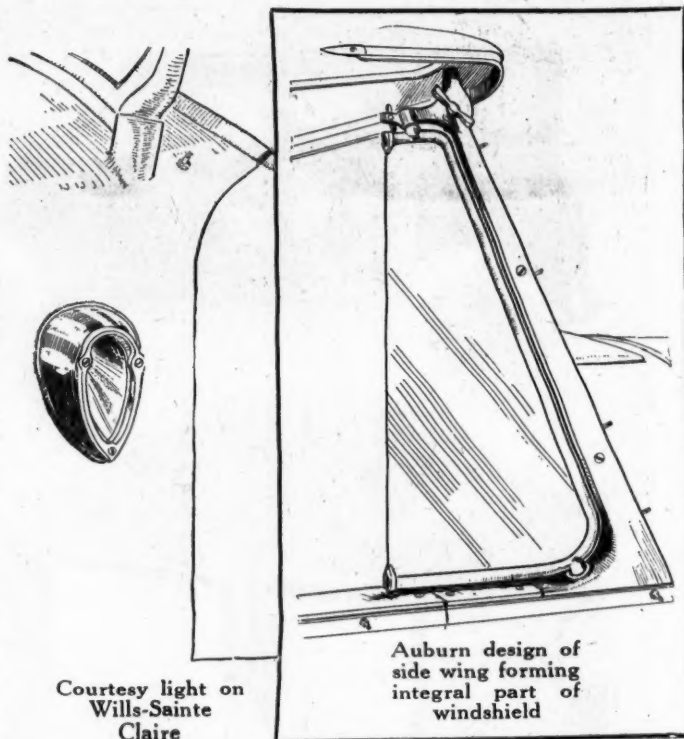
As to the materials used in the various models cloth trimmings, velours and wool fabrics were about equally divided. On the new models, wool fabric was favored and the preferred color seemed to be dark gray with pin stripes. Grays that had a considerable mixture of green were also used, as were some blues. On the town-car types, broadcloth was the favorite. Vanity cases were usually the visible, natural wood finish. Very few concealed vanity cases were used.

Pockets on the doors were the rule. Robe-ralls, foot-rests, heaters, dome and corner lamps, as well as silver-finished interior hardware, were commonly used. The use of natural wood trim is trying for a comeback. The Noma sedan had the entire roof panel of wood, as well as the standing pillar inside, so finished. This year will see many of the little interior furnishings that go to embellish the special body made part of the equipment of many stock cars.

The capacity of the medium-priced inclosed body model was five passengers. The new Durant and Rickenbacker had this size on all models. Many of the cars, however, having small capacity inclosed bodies had seven as well as five-passenger phaetons. The majority had, however, the regulation five-passenger sedan, four-passenger coupe and roadster. Two manufacturers showed the new close coupled closed body as their only inclosed car. In other instances it was exhibited as an additional model.

Top designs on phaetons have not undergone change except that more used khaki-colored fabric and more tops were lined than usual. A few were made with semi-victoria quarter curtains. The illustrated view of the Moon roadster is an indication of one way that tops for this type of car are designed. That of the Buick shows yet another top design.

The California top of the original character was exhibited



Courtesy light on
Wills-Sainte
Claire

Auburn design of
side wing forming
integral part of
windshield

by Leach. It was also exhibited by the H. C. S. in a modified form. Two other cars had tops of regulation California design, as it has been made over to suit eastern trade. There is no evident leaning toward a more general use of this top, despite its many advantages. The cost of these tops are their greatest impediment to more common use.

Color combinations exhibited were varied enough to enable any phase of discriminating taste to be suited. There were only two unhappy color combinations. If the colors displayed are indicative of what the production colors are to be, maroon and black have superseded the blue and black that have been the standard for so long on inclosed bodies. In some cases, when these colors were used on phaetons or roadsters, the wheels were red. Sometimes natural wood finish was used and at times wire wheels were nicked or white. Disk wheels usually had nicked rim and hub flanges.

Yellow, when used for inclosed bodies, was combined with black, and on open bodies with brown or blue. The extent to which colors were used can be estimated by the fact that over two-thirds of the bodies had bright or near-bright color combinations. This does not include bodies that have merely added striping. When we add to these attractions the large number of cars with wire and disk wheels, cycle mudguard and steps, together with the various features previously noted, the attractiveness of the body presentation ranks well ahead of previous years.

From the viewpoint of design, the bodies are uniformly good. Conventional trade has stabilized various models for specific use. The line of demarcation is more defined, the selling quality is the strongest controlling factor, and the writer's deduction, from a careful review of the season's offering, is that there is no evidence of cheaper quality or methods of manufacture to warrant the current talk in the trade of very low-priced bodies. Neither is there any evidence of cheap models that are available as substitutes for the standard models exhibited.

ABOUT FORD

An interesting book has just been printed under the title "The Truth About Henry Ford." While the little volume appears to be all truth, it does not impress one of being the whole truth. It rather leaves the impression that would follow the reading of a newspaper story or magazine article, hastily done, probably calculated to sell on a present wave of interest but lacking in permanent value. It is written by Sarah T. Bushnell, who quotes Mrs. Ford quite freely, and is published by Reilly & Lee, Chicago.

Georgia Dealers Adopt Used Car Information Exchange Plan

"Trade Right, Fix Right, Sell Right," Byword of Georgia Automotive Dealers' Assn. Point Out Necessity of Stable, Uniform Prices and Information

THE Georgia Automotive Dealers' Association has adopted a used car merchandising and exchange information plan that is in use among more than 100 automobile dealers throughout the state. While the plan is a comparatively new venture in Georgia at least, excellent results have been accomplished.

The executive committee of the association, in working out the plan, concluded that the power to solve the used car problem lay entirely with the individual dealer himself, and that he would have to do just three things in order to solve that problem successfully. These three things are:

TRADE RIGHT.

FIX RIGHT.

SELL RIGHT.

And those are the three basic principles about which the plan revolves, but it demands the whole-souled co-operation of the merchant who expects benefits.

As to the primary step—that is, to **TRADE RIGHT**—it is necessary that the dealer be conversant with the used car market and that he co-operate in the effort to do away with "long trades." Whatever the existing market prices may be on a particular make of car in his zone, taking the condition of the car into careful consideration of course, the dealer should not offer more than that price, even though he may lose the sale.

Bulletin Sent Out Semi-Monthly

To provide the used car market information for dealers, the association compiles data each two weeks in the Atlanta headquarters office, and sends it to every member who is operating under this plan. The state has been divided into three separate zones including North Georgia, Middle Georgia and South Georgia. Each dealer is supplied with blanks and is expected to report every Saturday on all used car purchases and all used car sales of the week. On this form, the information required is the make of the car, model, year, type, passenger capacity, number of cylinders, horsepower, list price when new, condition—good, fair or bad, price allowed for the car by the dealer, cost of any repairs and the price at which the dealer sold the car.

Every other Saturday Percy A. Megahie, secretary of the association, digests by zones this information and mails the

result to all dealers. The South Georgia digest is sent only to the dealers in that zone.

Suppose, for example, a Chevrolet car in good condition is brought to a dealer in the South Georgia zone, the owner wishing to make a trade. Having ascertained that the car is in good condition the dealer looks over his last report from the association and notes that there are three Chevrolet cars entered thereon, each reported in good condition, and the same model, type, etc., as the car just offered to him. He knows at a glance therefrom what prices are being paid by other dealers in his zone for a car just like this. Thus he is doing his part to stabilize the market.

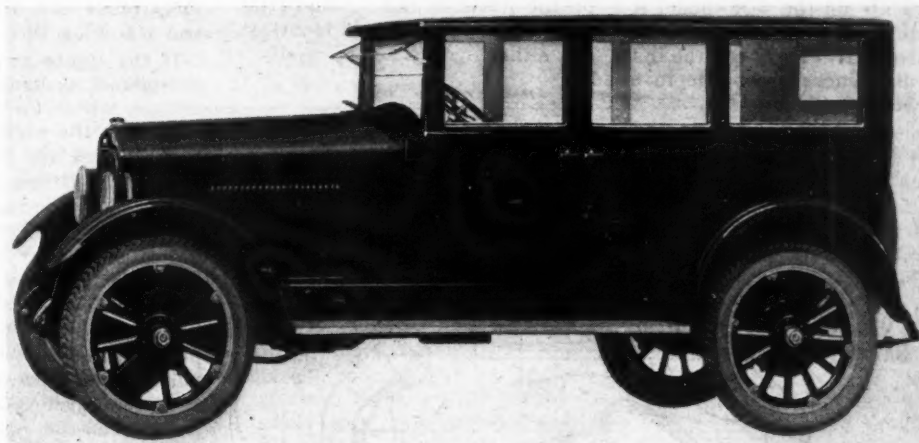
The second step of the plan is to **FIX RIGHT**.

Whatever the car may need in the way of repairs, painting, overhauling, the policy of this plan is to have the dealer do that work in his shops or station, and not to sell the car in the condition he receives it unless he can tell his buyer with a clear conscience that the car is really in "good condition."

The third condition is **SELL RIGHT**.

The following statement in a recent bulletin of the association expresses the importance of this point quite clearly:

"Give the fellow who buys the car his money's worth so that he will be a used car booster instead of a used car cusser. If you sell a man a car which needs two new tires, a new battery, new piston rings, and new brake linings, for \$400 say, and he soon comes back and pays you \$50 for the new tires then in about a week \$30 for a new battery, and a few days later \$20 for new rings and \$5 for brake linings, he will forever cuss you, the car and all other used cars. He tells everybody that the used car is a fake and an expense. If you had put all of those things on the car in the first place and charged him \$505 for it the sale would not only have been easier made, but you would have had a satisfied customer. The result would have been precisely the same so far as the amount of money is concerned at least. This man would have driven his car with satisfaction, and always boosted you as the right sort of a dealer."



New Jewett Sedan to Sell for \$1395

JEWETT Motors will go into production March 10 on its touring car model and will build about 500 cars in the first month. This production will be increased to about 1800 in April and will continue at that point until July 1 by which time 6000 cars will be supplied. A new schedule will be laid out at that time.

The company will confine its building operations to the touring car for the first few months and will start the sedan about May 1. The other models, road-

ster and coupe, will be added later. The touring is priced \$1065 and the sedan \$1395. Prices on the other models have not been fixed.

Manufacturing of the Jewett line will be carried out at the Paige factories, two new assembly tracks to be laid out for the Jewett line. There is sufficient room at the factory for both Paige and Jewett production in 1922 according to factory engineers. Forty thousand dealers will be circularized on the new Jewett line this week.

"Shooting" Electrical Troubles Should Be Easy If You Have These Articles to Refer to

The following have been described in previous issues:

Car	System	Issue
Ford	Ford	Nov. 10, 1921
Dodge	North East	Dec. 1, 1921
Buick	Delco	Dec. 15, 1921
Overland	Auto-Lite	Dec. 29, 1921
Studebaker	Wagner and Remy	Feb. 16, 1922

Electrical System on 1921 Chevrolet Cars Models F-B and 4-90

*The Starting Motor and Lighting Generator Are Made
by Auto-Lite and the Ignition System Is Remy*

By A. H. PACKER

ARTICLE SIX

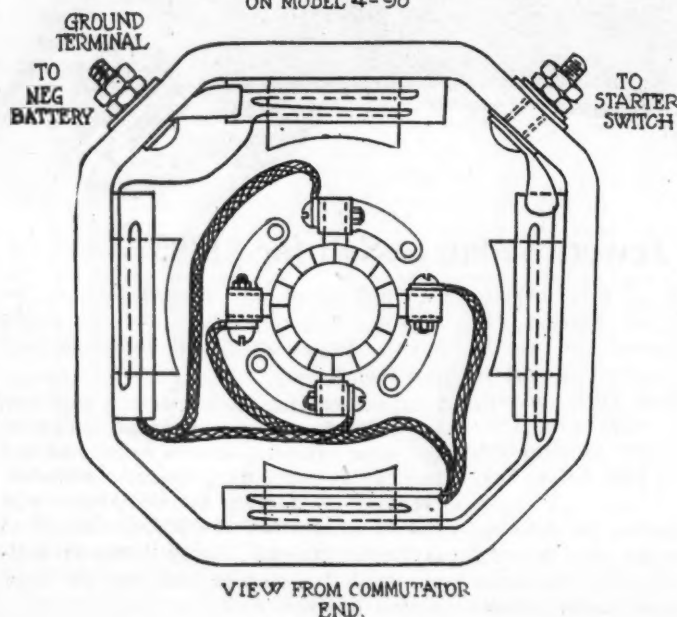
THE electrical system used on the 1921 Chevrolet cars includes starting motor and lighting generator made by the Auto-Lite Co., while the Remy ignition is used. The ignition coil is mounted on top of the generator, while the interrupter distributor is set in a socket at one end of the generator and is driven by a pair of spiral gears from the generator shaft.

The cutout, used to connect the generator to the battery and disconnect it again when the engine stops, is mounted on the dash on the F-B model but is located on the generator on the 4-90 model. On the F-B model the junction box is at the right side of the car, fastened in the channel of the frame, while on the 4-90 model it is on the left side rail. Aside from these two minor details the wiring of the two cars is identical, so that Fig 1 can be used for either model if these slight differences are borne in mind.

Starter Circuits

A novel feature of the starter circuit is that although a

FIG. 2. AUTOLITE STARTING MOTOR.
USED ON MODEL FB CHEVROLET CARS
CIRCUITS & CONSTRUCTION SIMILAR
ON MODEL 4-90



grounded wiring system is used, the frame of the car is not depended on to carry the return starter current, for a copper cable connects from the negative battery terminal to the grounded starter terminal, while the positive battery is connected to the starter switch, which in turn is connected to the insulated terminal on the starting motor.

Closing of the starter switch thus completes the circuit, causing the Bendix pinion to mesh with the teeth on the flywheel, thereby cranking the engine.

Starter Trouble

When the starter fails to crank the engine, the nature of the trouble can often be determined by turning on the lights and watching their action as the starter button is pressed.

If the lights go completely out when the starter circuit is completed, it usually indicates corrosion at the battery terminals, where the cable terminal connects to the battery post. If this is the case, a voltmeter can be used connected at the battery post and the terminal attached thereto, and while the voltmeter is thus connected the starter button should be operated. If the voltmeter shows no appreciable reading, the connection is alright, but if the meter reads a volt or so, it indicates a poor connection which is using up most of the pressure from the battery so that the motor does not get the current it requires.

If the lights do not dim at all when the starter button is pressed, it shows that no current is flowing to the motor, and voltage can now be taken at the battery and at the motor. If the motor terminals show the same voltage as the battery, it indicates an open circuit in the motor itself, possibly due to the brushes being worn down so far that they do not touch on the commutator.

To see if this is the case, it is well to remove the motor commutator cover, which is held with two small screws at the end of the motor. The brushes can now be held firmly against the commutator with the fingers while someone else presses the starter button. If the trouble is in the brush contact, the extra pressure with the fingers will usually overcome it and the starter will operate alright. It is, of course, necessary to remove the starter and install new brushes before satisfactory operation will be obtained.

If the lights dim considerably but do not go out, it indicates either that the battery is nearly discharged, or that the battery is in good condition, but there is a short or ground in the motor, which is drawing a heavy current but not through the proper windings.

The battery can be checked with a hydrometer to see if

the gravity is above 1175, as below that point the battery can be considered discharged, a charged battery usually showing a gravity of 1280. Another check on the battery can be made with a voltmeter having a low reading scale, approximately three volts. This meter can be connected across one cell at a time and the reading taken while the starter button is operated. If the cells all show approximately the same, there is no defect in any cell. If one cell shows a low reading or a reading in the wrong direction, that cell is shorted internally and the battery should be rebuilt. If all cells show a voltage of about 1.8, the battery is fairly well charged, but if each cell shows a voltage of 1.0 or 1.2, the battery is probably discharged.

To check the starter for shorts, an ammeter capable of reading from 350 to 500 amp. should be used in series with the starter circuit, and if the reading is over 200 amp., and with a free engine, the starter will not operate, it is a certain indication that there is a short or ground inside the motor, possibly in a field coil being grounded to the field pole or frame of the machine.

Removing Starting Motor

On the F-B model the starter is removed by first taking off the sheet metal cover over the Bendix drive and then removing two cap screws which go into the end of the motor. On the 4-90 Model there is no cover over the Bendix drive and the cap screws that hold the motor are in under instead of at the end of the motor.

Repairing Starter Motor

The internal circuits of the starter motor used on the F-B Model are shown in Fig. 2 and the construction of the type used on the 4-90 is practically identical, so that this diagram can be used for either.

To test for grounds, the field strap should be disconnected from the ground terminal shown at the left side of the sketch, and 110-volt test points with a lamp in series with one of them should be used, touching one to the frame of the motor and the other to the live or insulated terminal at the right. In this test, if the lamp lights, it shows a ground.

The connections should then be removed from the brushes, and the armature, brushholders and fields tested separately to locate the exact position of the trouble. Should the ground be in one of the pairs of field coils, its exact location can be found by connecting a battery to the coil and to ground, and a curl of smoke rising from one of the coils will quickly locate the defective spot. This coil can then be removed and insulated with tape or fish paper.

Starting motor trouble is, however, usually located by inspection, the most common trouble being burnt and roughened commutator, which requires turning down. At the same time it is usually best to install a set of new brushes.

Lighting Circuits

To trace out the lighting circuits, reference should be made to Fig. 1, also to Fig. 6, which shows a larger view of the lighting switch.

Current for the lights comes from the terminal of the starter switch to which current comes from the positive battery. This smaller wire can be traced to the ammeter and from the other ammeter terminal a wire goes to the BAT terminal at the lower end of the fuse on the back of the lighting switch. Through the fuse the current goes to the horn terminal, just above the BAT terminal, and current for the horn goes directly to the horn button, located on the steering column, just below the wheel. When this button is operated, current flows

Wiring of Auto-Lite and Remy System on 1921 Chevrolet FB TAIL LAMP PLUG

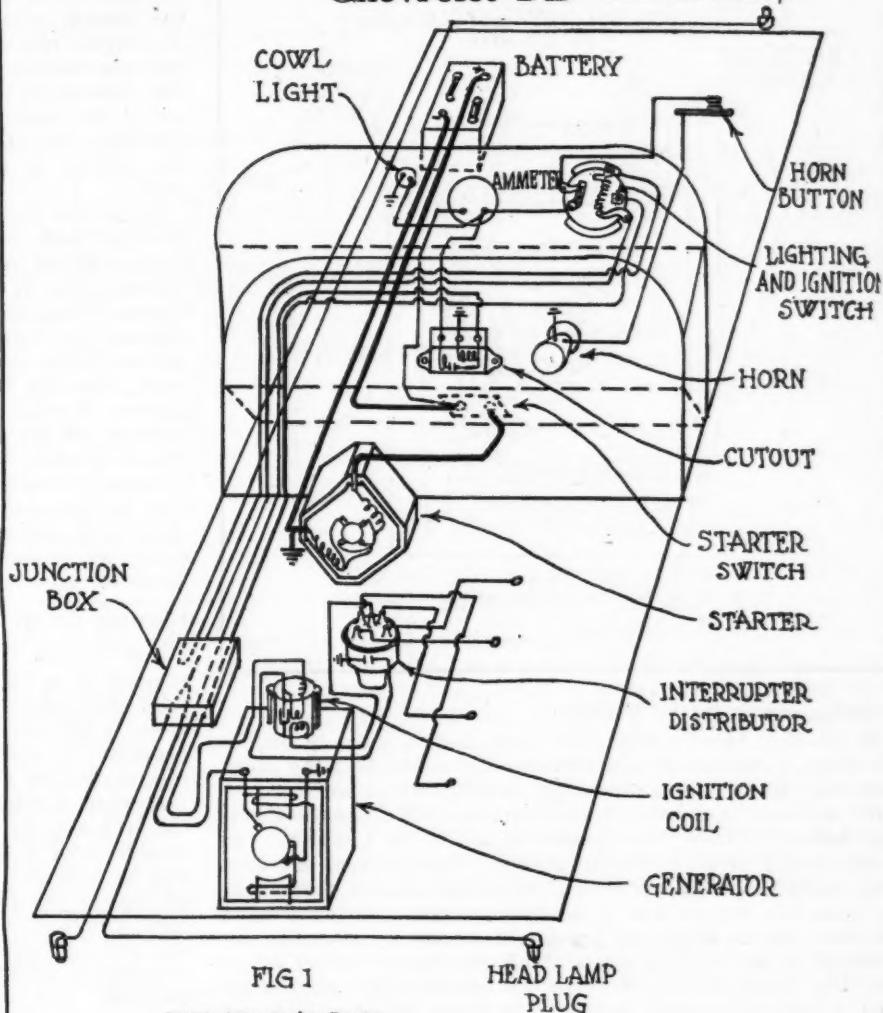


FIG 1
WIRING DIAGRAM
1921 CHEVROLET CAR MODEL
F. B.

through the horn to ground, the circuit being completed through the heavy cable on the negative terminal of the battery which gets its ground at the starter terminal.

When the lighting switch is turned to the DIM position a connection in the switch is made from the upper end of the fuse to the terminal marked REAR, so that current goes directly to the tail light, but must go through the dimming resistance to the head lights. In the BRIGHT position of the switch the same internal connection is made to the terminal marked REAR, but an additional connection is made to the terminal marked HEADS so that the head lamp current no longer goes through the dimming resistance and the lamps will operate at full brightness.

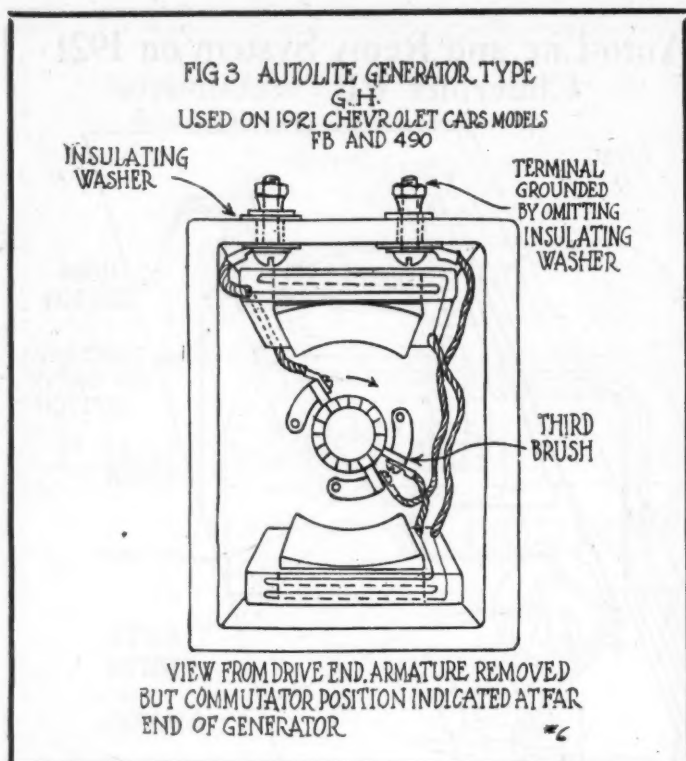
Current for ignition does not come through the fuse, but when the ignition is turned on goes directly from the BAT terminal to the IGN terminal.

The cowl light is independent of the switch, being connected directly from the ammeter, and having a small switch of its own at the base of the lamp socket.

Lighting Trouble

If none of the lamps light except the cowl light, and the horn also will not operate, it is quite likely that the fuse is blown, indicating possible ground in one of the lighting circuits, which should be eliminated before the fuse is replaced.

If one of the lights only refuses to operate, it is quite likely that the bulb is burned out or that the plug does not make contact in the lamp socket. If both head lamps fail to operate, it is possible that there is an open in the main wire from the switch to the junction box.



Locating shorts in the Wiring

If the fuse blows continually, indicating a short in one of the wires, it can be located by removing all of the lamp plugs from their sockets and connecting a voltmeter across the fuse clips in place of the fuse. The voltmeter will then read battery voltage if there is a ground in any of the circuits. The wires should then be disconnected from the switch, one at a time, until the voltmeter ceases to indicate, which shows that the defective circuit has been disconnected. Having located the wire that is giving the trouble, it is now necessary to examine it to see if at any spot the insulation is rubbed off so that the wire is in contact with the frame of the car. When such a place is located, it should be taped up, after which it is safe to put in a new fuse.

Generator Circuits

The internal generator circuits can be traced out by referring to Fig. 3, and in this sketch it will be seen that there are two main brushes opposite each other and that they each connect to a terminal. The other brush is the third brush to which the field is connected, the other end of the field winding going to the insulated terminal at the left. The right terminal is grounded by omitting the insulating washer under the terminal nut.

Referring to Fig. 1, it will be seen that a wire from the live generator terminal goes to the right or GEN. terminal of the cutout, and through the fine winding to the center terminal of the cutout, which is grounded on the speedometer on the cowl board. As the generator voltage increases to seven or eight, the current in this fine winding closes the cutout points connecting the GEN. terminal of the cutout to the BAT terminal, allowing current to flow through the ammeter to the battery.

Details of the cutout on both models are shown in Fig. 5, the internal circuits being the same but the external location of the terminals varying slightly, as shown in this sketch.

On the 4-90 model the location of the cutout directly on the generator means that there is a wire from the ammeter going directly to the live or BAT terminal of the cutout, but no inter-connecting wires are needed between the generator and the cutout. Electrically, however, the circuits on the two models are identical.

Locating Generator Trouble

When the generator fails to show a charge on the ammeter, it is well to turn on the lights and see if the ammeter shows discharge just to make sure there is no trouble in the meter itself.

If the meter seems to be alright, it would be well to remove the cover on the cutout and close the points by hand, at the same time watching the ammeter. With a normal generator the meter will indicate from 15 to 20 amp. discharge, but as the current draw is nearly that much if the armature circuit is alright, but the field circuit is open it is well to remove the commutator cover and lift the upper main brush from the commutator. Now operate the cutout points again and see if the ammeter reads about $1\frac{1}{2}$ amp. discharge. If so, it indicates that the field current is about right, but if there is no reading on the meter it shows that the field circuit is open.

With field circuit in good condition and a heavier current obtained with the main brush again on the commutator, the engine should be started with the cutout points still held together. The 15 amp. discharge should now decrease as the engine is speeded up until the ammeter shows zero. Further increase in engine speed should cause the ammeter needle to go over to the charge side of the meter to about 10 or 15 on the scale, showing that the generator is alright. If the charge current is only about $\frac{1}{2}$ amp. or perhaps the needle is still slightly on the discharge side of the meter even with the engine running at high speed, it usually shows a shorted or grounded armature.

If the generator seems to be alright, but will not cut in by itself, it should be checked with a voltmeter, and if the voltage comes up to eight or more, it indicates that the generator is doing its part, but that the cutout does not work as it should.

Locating Cutout Trouble

After taking voltage at the generator, the cutout should be checked in a similar manner, voltage being taken across the GEN and GROUND terminals, and if no reading is obtained, it is likely that there is a break in either the main wire from the generator or else the ground wire to the speedometer is not making proper contact.

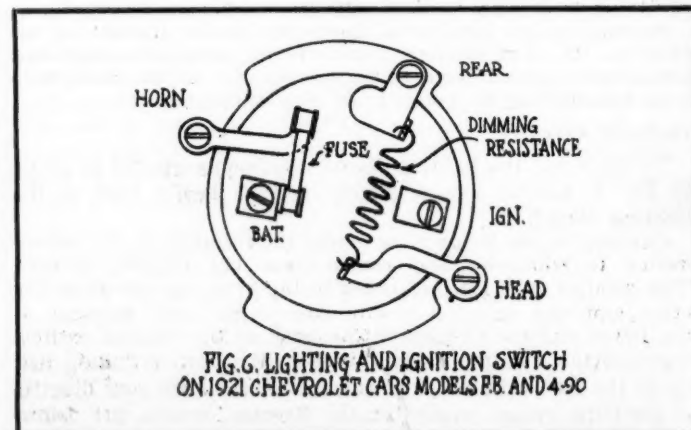
If there is voltage at the cutout, but it will not close, either the spring is too stiff or the fine winding is open, the latter trouble usually requiring a new cutout, unless the open circuit is apparent and can be readily fixed. With the cutout off the car, the fine winding can be tested by using eight volts from a battery, which should cause the points to close, while six volts should just be insufficient to close the contacts, although it might hold them closed if they were first closed by hand.

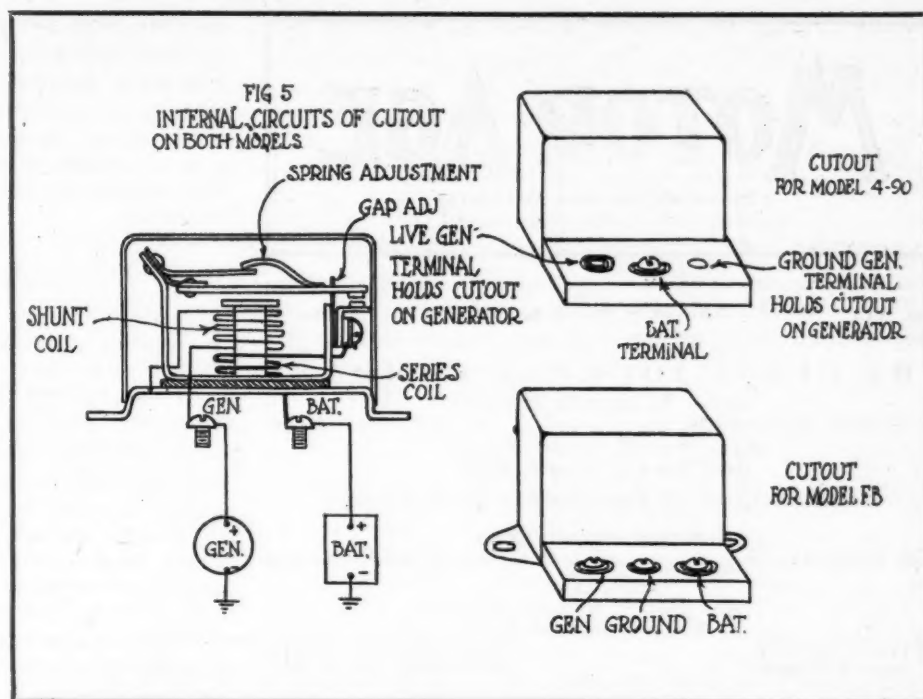
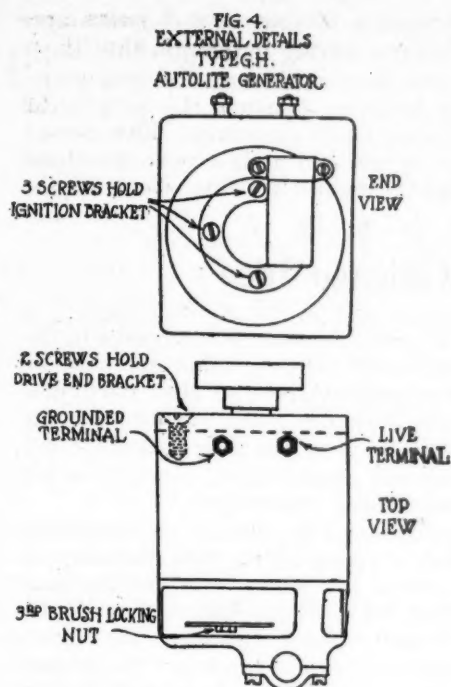
If the cutout seems to be alright, and the generator works when the points are closed by hand but will not cut in by itself, it is possible that the commutator and brushes are oily or dirty, or that there is a poor connection in the field, which prevents the generator building up from its residual magnetism.

Removing Generator

When it is necessary to remove the generator, it is well to check the ignition timing, so that it will not be necessary to retune the engine when the ignition unit is replaced in the drive socket in the generator.

This can be done by retarding the spark lever, then removing the distributor cap and marking the location of the distributor arm with a couple of file marks on the side of the inter-





rupter casting. If replaced in the same position, it will not be necessary to retune the engine.

After the timing has been marked and the ignition unit removed, the generator can be taken off by removing the cap screws which hold it to the crankcase.

Repairing Generator

Before taking the generator apart, it should be run as a motor, the normal current being about $2\frac{1}{2}$ amp. A much heavier draw usually indicates a shorted or grounded armature, which is also indicated by uneven or jerky rotation and by uneven indications on the ammeter. An open armature is also noticed by uneven running but will not pull so much current and usually shows a burnt condition on the edge of two commutator bars at opposite parts of the commutator.

Disassembling Generator

Referring to Fig. 4, it will be seen that there are two large countersunk head screws that hold the bracket at the drive end of the generator. With these removed, the armature and drive end bracket can be drawn out together. In doing so, however, care should be taken to hold the brushes up from the commutator so that they will not be broken or chipped by the oil slinger, which is of somewhat larger diameter than the commutator.

Testing Generator

After the generator has been reassembled, it should be checked as a motor and should run clockwise from the driving end. It should then be driven to check generating action before being installed on the car, to see that it builds up all right and also to see that the output is about right. This can be varied by means of the third brush adjustment shown in Fig. 4, rotation of the brush with the direction of rotation operating to give more charging current, while shifting the brush the other way, of course, reduces the output to the battery.

Current requirements will vary with driving conditions and weather, but for average conditions will be eight to 10 amp. in summer and 15 to 18 amp. in winter.

Ignition Circuits

With the ignition switch turned on, current goes from the IGN terminal to the terminal of the ignition coil that connects with the ballast resistance. This terminal is the right-hand one in Fig. 1 or the left-hand terminal in Fig. 7, where the coil is shown enlarged and with the circuits more in detail.

Referring to Fig. 7: the current goes through the ballast resistance, then through the primary winding around the iron core and then out to the insulated contact in the interrupter, the circuit being completed to ground when the points in the

interrupter closed. Proper operation of this circuit can be checked by watching the ammeter, as with the ignition switch turned on, slow turning of the engine should close and open the interrupter points, causing the ammeter needle to first indicate about five amp., then zero, then five and back to zero again, as the contact is made and broken.

Should the ammeter fail to show any current, it is likely that the circuit is open or that the points are not making contact, while if the ammeter indicates a steady current of about five amp. it shows that the interrupter points make contact but do not separate, or else that the live interrupter contact is accidentally grounded.

If the primary circuit is all right, as indicated by the ammeter, the wire from the side terminal of the coil to the center of the distributor should be removed from the distributor and held about a quarter of an inch from some metal part of the car. At the same time the distributor cap should be removed, the ignition switch turned on and the interrupter contacts opened and closed by hand. A good spark should now jump the quarter inch gap to the frame of the car, but if the spark will jump only a short distance, say $\frac{1}{32}$ in., it shows that either the secondary winding or the condenser in the coil is defective. In this case the practical remedy is the use of a new coil.

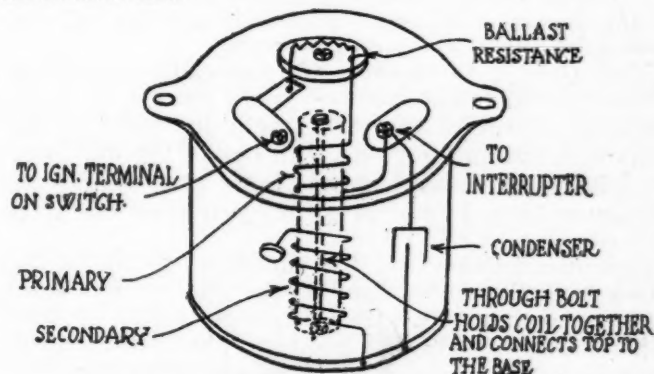
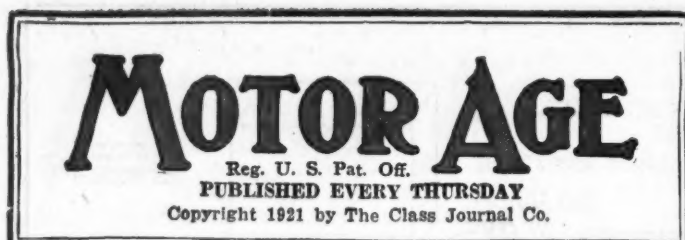


FIG. 7. REMY IGNITION COIL USED ON CHEVROLET 1921 CARS MODELS F B & 4-90

And more Packer articles to come in future issues of MOTOR AGE:

The Remy System on 1921 Oakland cars, Model 34-C. The Auto-Lite and Simms-Huff Systems on 1920, 1921, 1922 Maxwell cars.



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The Week's News

THE information that we bring to you this week in our news pages is especially optimistic and we cannot refrain from calling your attention to some of the reports that mean good business for all concerned in the automotive industry.

The Detroit dispatches are especially optimistic. From the individual factories come reports of manufacturing schedules that are practically those of two years ago and an interview with one of the most conservative of the manufacturers hints at a waiting list for automobiles before the spring deliveries are at an end.

One manufacturer had the hardihood to talk in this strain several months ago but he did not get much applause at that time. He was congratulated by some of his associates as being a good sport but none believed what he was saying. Now there are indications that he was right and that deliveries of many makes of cars will not be made as rapidly as the buyer wishes this spring.

This of course should not be taken as an indication that we are entirely out of the woods as to the automotive business. Spring always has been the peak months of the new car trade and always will be. A busy spring is, of course, a good indication but even if there is something of a buying jam this spring it will pay all hands to keep an eye on the weather to come and not to assume that we are going to rush into

another peak period similar to that of two years ago.

This buying demand is a strong indication that those who have assumed that they could not find any maintenance or accessory business because the people did not have any money were badly mistaken. The money is in the hands of the people and he is a wise merchant who proceeds on this principle for his share of the business.



A Chicago Idea

IN almost every city of size in the country there is a lumber building, a railway building, insurance building and other very large buildings that are planned to house chiefly the representatives of that particular business. It is evident that it is good business for the representatives of these lines to get near to each other and establish an industrial community. But so far we do not know of an Automotive Building.

Thomas J. Hay, president of the Chicago Automotive Trade Association, has a vision of the first building to be so known being erected in Chicago in the very near future. His idea is that the Chicago Automotive Trade Association should promote such a move. He thinks that the Trade Association can easily obtain the proper site and then by inviting investments from men within the industry finance the building. This structure, as Mr. Hay sees it in this ambitious dream, will be as large and will be as creditable to our industry as other buildings are to those industries. He sees it as a building that will do much more to impress the public than a frequent repetition of the statement that ours is the second largest manufacturing industry in the country.

This building, thinks Mr. Hay, should house dealers on the first floor and perhaps the second, above these floors there should be offices for the Chicago Automotive Trade Association, for the license bureau, many office suites for manufacturers' agents who are dependent upon this industry and for publications and kindred industries.

Such a building, thinks Mr. Hay, would be a magnet in drawing important offices to Chicago and inducing organizations connected with the industry in locating branch offices in the city even if they did not establish their headquarters here. So far Mr. Hay has not met with the encouragement that he expected but every time he talks of this plan he finds new supporters.

Such a plan is typically a Chicago plan and undoubtedly Mr. Hay will meet with the success his plan deserves.



Perfect Organization and Harmony

A CHICAGO dealer, owner of a large maintenance station, has adopted for a motto, something that means this much: "That I will have for my customers, a perfect organization, a staff of men who will give every service possible and who will be able to answer for every mistake they make—with their jobs."

There are parts of this dealer's philosophy that are unusual and, as in everything unusual, there is the element of impossibility.

He honestly believes that there is such a thing as a perfect organization and that his men should do their work but once and do it faultlessly. This, of course, is wrong, because these men are human and do not come with guarantees that they will perform everything they attempt, like some machines do.

The dealer, aside from being unusual and impossible, is a bad business man. He pointed out to a Motor Age representative how he was attempting to build a perfect organization by watching his men closely and finding their faults—to here his plan is good—but then, instead of correcting these faults, he simply ascertains what

they are and then fires the man. Then, when he is interviewing an applicant for the vacant position, he asks the new man if he knows how to do the work the other man made his mistake at doing. If he does, he gets the job. In this way, the dealer is always firing and hiring men, for, when he makes up the shortcomings of one in another, the other has his shortcomings which also must be made up.

Slowly this man is hiring and firing himself out of business and into the lines of the has-beens and dreamers—dreaming of and longing for the impossible, like having good intentions, is one of the ways to failure.



The Flat Rate Plan

THERE remains a lot of explaining to be done in regard to the meaning of the term "flat rate" when used in connection with the selling of automotive service work. Many who are opposed to the system, we find do not thoroughly understand what it is all about.

Recently a man made a statement that he did not believe in the flat rate system because he said it is difficult to conceive of a man working on a job of grinding in a set of valves on a Ford engine, then doing the same job on a Packard engine and charging a flat rate of \$8 on both jobs. Of course it would be difficult to conceive of this. It is not the flat rate idea correctly applied.

The flat rate simply means that a price of say \$8 might be put on the job of grinding the valves on a Ford, but it would be perhaps \$18 or \$20 on a Packard. In other words, the price is commensurate with the nature of the job on a particular car. It does not mean that all bearing work and all axle work on all cars will be done at the same rate. A flat rate price must be established for every operation on a car and priced according to the car and the labor involved.



Cleanliness Is Next to Good Workmanship

MANY of the harbingers of spring are at hand. The small boys are playing marbles and housewives are preparing for housecleaning. A rise or fall in the mercury may cause misgivings, but that cannot alter our position on the early calendar.

Spring housecleaning in the automobile maintenance station is not a well defined institution. It is a flexible term when applied to the maintenance of motor vehicles. It may mean anything from overhauling the heating system to beating the office rug. The degree of its completeness is determined by the mental attitude of the management. The appearance of the service or maintenance building reflects to the owner the attitude of the management. An uncleanly place is very seldom construed as a sign of mental temperament such as good technical men are reputed to possess. This so-called temperament takes some peculiar forms of expression. The temperamental workman who does his best work in a workshop that is dark and dirty is as rare as the temperamental housewife who does her baking in the coal shed.

The spring cleaning in the service building should include all of those details that are included in the housecleaning at home. Equipment machinery should be cleaned and overhauled. Work benches may require the attention of the amateur carpenter. The application of the paint brush to the walls and woodwork will give a more cheerful and pleasing appearance. The item that is most often overlooked, but which is of greatest importance, is cleaning the floors. Some service station floors have been the melting pot, for months, for the grease and dust and mud from every state in the Union. A thick coating of grease

and mud on your service station floor has its effect on customers and prospective customers. The development of patented cleaning solutions has made it possible to really remove an accumulation of mud and grease that heretofore would have been considered impossible to remove. This applies equally well to concrete and wood floors. A clean floor is probably the most effective sales argument for the maintenance department.



Neglected Opportunities

AT the Minneapolis Automobile Show an effort was made to line up the salesmen somewhat similar to the plan used in Chicago. The men were trained along certain lines and were generally pepped up for the show. During the show a "prospect" made the rounds of all of the exhibits to award a daily prize of \$20 to the man who gave the best account of himself. This is the report of the man who \$20 to be given away:

Forty-one (41) exhibitors were interviewed. Of this number, the prospect received absolutely no attention in eighteen (18) different exhibits. In each of these exhibits he walked around the cars, opened the doors and showed every sign of interest but the salesmen in attendance paid no attention to him. In making the rounds, he visited one of these exhibits three different times, where two salesmen were in attendance, endeavoring to get one of them to explain certain features of their car. Both of these salesmen stood quite some distance from the car and would let the prospect walk from the car to them and ask a question, and the prospect would then walk back to the car hoping the salesmen would follow him (but in no instance was this done) and he repeated this several times under the observation of one of the directors of the association.

In sixteen (16) of the booths, he was given courteous but very brief attention.

In only seven (7) of the booths, was there an apparent effort made to interest him in the product.

The appearance of the "prospect" apparently had little to do with the attention he received since an analysis shows that of the booths in which he received the proper kind of attention the cars varied from the lowest to the highest priced cars on the floor.

In the booths of the large distributors the "prospect" received scanty attention except in one instance.

It is probably rather a serious affair for some of these salesmen who ignored this man with \$20 ready to hand to them, but think how much more serious it is for the employer who is investing money in the man. Some day the employer will "get next."



A Troublesome Brake Rod Installation

SERVICE men who work many times on a car long after the maker of the car gets through with it are in a good position to find the "jokers," as they call poor design and construction in cars. Several of these jokers have come to our attention and we cite one here.

On a popular make of car there are four brake rods which are quite long. These reach from the brake rocker shaft on a cross member to the levers on the rear axle. About 12 inches from the rear axle, turnbuckles are placed in the rods to take up the slack in the brake mechanism. These turnbuckles are heavy and of the open type. The result is that the rods get to whipping and break, usually just ahead of the lock nut at the front end of the turnbuckle, where the threads are and the rods are necessarily smaller in diameter.

A remedy would seem to be to fit turnbuckles of the closed or sleeve type, which would be lighter than the others, or to support the rods in some way to take care of the vibration. Anyway, it's a condition that exists on this car and causes the service man a lot of trouble both in explaining to the customer and in replacing the rods.

Enthusiasm In Sales Outlook

Full Capacity Schedules Rule in Detroit Factories

Cheerfulness Spreads Throughout Industry—Increased Production Seems Assured for March

DETROIT, March 6—Production in Detroit factories for February has been notable for the number of companies working on full capacity schedules, a condition which has led to establishment of record February business in a large number of plants. Taken as a whole, it is likely when complete figures are ascertainable, that a new February production mark will have been made in the Detroit district.

Dodge, Maxwell, Studebaker, Cadillac and Hupp are the factories already near maximum production. Dodge has been running along at about 600 daily, Maxwell 200, Studebaker 400, and Cadillac 100. Ford has as yet failed to get into full swing on cars but is making a record breaking number of tractors at River Rouge, schedules now approximating 200 daily. Car production in February continued on a four day week basis.

Throughout the length and breadth of the industry there is a constantly growing feeling of cheerfulness. In every factory there will be a greatly increased production in March, notwithstanding that February ran far ahead of anticipations. Hudson-Essex have practically tripled their parts and material releases for March, and President Roy Chapin said it would triple production of March of last year.

Lincoln Motors will increase its production to a 30 daily basis in March. Increases will also be made by Wills-Lee, Roamer and Handley-Knight in the better class field. Rickenbacker, which shipped 250 in February, will go to a 20 daily schedule in March. Orders are reported ahead to summer.

In the General Motors division Buick is preparing to go on full production. Olds has laid down a schedule which will approximate 70 daily in March. Oakland will build better than 100 daily. Chevrolet has laid down a schedule which calls for 50,000 production by July.

Durant Motors has been operating during February at the Lansing plant on a schedule of 40 daily and expects to reach 100 daily by April 1. The company was handicapped by non-delivery of closed bodies in February. Five hundred enclosed types will be built in March. Reo has been operating steadily and looks for heavy production in March with dealer stocks of cars and speed

wagons undergoing rapid dissolution.

Dort has laid down a schedule of 50 daily which will be stepped up as rapidly as possible. Orders are reported to run ahead to early summer. Paige has been rounding into production slowly during February and will get going firmly on its Paige and Jewett schedules in March. Earl Motors has been building 20 daily in February and will increase this to 30 in March.

Columbia Motors is speeding up things at the factory in anticipation of production in April on its new \$985 line. March production will be solely of the former line. Liberty is all ready to enter upon a heavy manufacturing schedule. Saxon is running along at five a day pending the determination of new manufacturing policies.

Studebaker Expects to Make 93,000 Cars During 1922

South Bend, Ind., March 3—From Jan. 1 to Feb. 10 the Studebaker Corp. of America manufactured 10,683 cars, as compared with 3528 in the same period a year ago. Production for the month of January was 7243. Studebaker expects during 1922 to produce 93,000 vehicles, as compared with 6,800 in 1921 and 53,000 in 1920.

The New York City area shows the largest increase in business over a year ago, the increase being 135 per cent. Boston has an increase of 84 per cent, and the Philadelphia territory an increase of 61 per cent. Studebaker production is running on a basis of 40 per cent among the three models of Light Six; 40 per cent Special Six, and 20 per cent Big Six.

Milton Wins 250-Mile Race at Los Angeles—Murphy Close

Los Angeles, Cal., March 5—Tommy Milton won the 250-mile automobile race at the Beverly Hills Speedway near here today in 2 hours 15 minutes and 20 seconds. Jimmy Murphy was second and Harry Hartz third.

Ralph de Palma was making an average of 112 miles an hour when he was forced out of the race by a broken piston.

Frank Elliott placed fourth, Eddie Hearne fifth, and Joe Thomas sixth.

SHALER CO'S PLANT BURNS

Milwaukee, March 6—The plant of the C. A. Shaler Co., manufacturing tire repair apparatus and headlight lenses at Waupun, Wis., has been destroyed by fire with an estimated loss of \$300,000 which is partly covered by insurance. Three women employees were burned to death.

Ford Service Policy Will Eventually Govern Lincoln

New Owner of Lincoln Company Replies to Questions Asked By Motor Age

CHICAGO, March 3—It is the intention of Henry Ford to make the service of the Lincoln car as complete as that of the Ford car just as soon as possible, according to his own statement.

Recently MOTOR AGE addressed an inquiry to Mr. Ford and inquired if it was agreeable to him to answer the following questions:

1—Is the flat rate system that has been so beneficial to Ford dealers and Ford cars, to be put in effect for the Lincoln?

2—Is it expected that the Lincoln and Ford cars will be serviced through the same service departments?

3—Will you follow the well established Ford policy as to permitting parts made by other manufacturers to be used on the Lincoln car?

4—Do you expect to make the Lincoln service as universal as Ford service?

The reply from Mr. Ford's personal office was as follows:

"Answering your inquiry addressed to Mr. Ford, we desire to advise that Ford policies will gradually be put into effect in the Lincoln Motor Car Co., or as fast as it is possible to do so."

NEW MARMON MODEL

Indianapolis, March 6—A new four-passenger speedster is now in production at the Marmon plant. It is a decided departure in appearance from the other open cars and gives an effect of length and lowness. Equipment differing from that of the open cars includes a trunk rack at the rear, spare wheel mounted in a saddle sunk in the left running board, top bows of natural wood with nickel plated mountings, nickel plated gear shift lever and steering column. The price is \$3950.

H. C. S. LOWERS PRICES

Indianapolis, March 6—The H. C. S. Motor Car Co. of Indianapolis has announced a new list of prices effective March 4, 1922. They are as follows:

	Old	New
Touring car	\$2775	\$2400
Coupe	3450	2850
Roadster	2725	2400
Sedan	3650	3150
All-weather roadster	new	2550
All-weather touring	new	2600

February Sets Production Mark

Steadily Increasing Sales Feature Winter's Output

Eliminating Fords, Gain for January Was 40% on Passenger Cars; 38% on Trucks

NEW YORK, March 7—With the coming of March, production schedules of most passenger car and truck manufacturing companies have been materially increased. Total production of cars and trucks the first month of the year was 90,486 as compared with 78,995 for December. Eliminating Ford, the gain for January was 40 per cent on passenger cars and 38 per cent on trucks. The increase was largely in the lower price classes.

Business in steadily increasing volume is coming to the parts and accessory manufacturers as the vehicle makers give unexpectedly early releases on materials to take care of expanding business. Sales in January exceeded January of last year by approximately 200 per cent. It is probable the excess for February was fully as large compared with the same month last year.

Shows Are Record Breakers

Manufacturers, especially in the Detroit district, are professing enthusiasm over the outlook and the same is true of dealers in all parts of the country. Wherever shows have been held the attendance has been record breaking, evidencing the interest of the public in motor cars. Dealers have booked many live prospects and the actual sales at retail have been far ahead of last year.

Prices on passenger cars apparently have been stabilized for some time to come. Most manufacturers have brought their selling prices as low as they can go until further cuts can be made in production costs. There is no immediate prospect of lower material prices. Revival of demand in the truck field is leading to price recessions by makers who have not made reductions recently and some sharp cuts have been made.

Rapid improvement in sentiment is apparent in the agricultural districts and the rising prices of farm products give every reason for confidence that farmers will be back in the market for automotive products in the near future. A questionnaire sent recently to representative farmers in the states of Washington, Idaho and Oregon brought the information that many of them intended this year to buy not only trucks but passenger cars. The farm market for light delivery vehicles is steadily improving. Export sales also are expanding.

Substantial sales of the more popular lines are being made in almost all parts of the country and it now is certain that the first quarter will show a very

large increase in business in comparison with the same period last year. It is not probable, however, that the second quarter will show so large a comparative gain because sales in those months of 1921 were surprisingly good.

While predictions are dangerous in a period of readjustment, it can be stated with reasonable confidence that passenger car sales this year will be fully as good as last, when they aggregated 1,500,000; truck sales will be considerably larger and the parts business very much better.

Glenwood New Car Planned For Youngstown Production

Cleveland, March 3—Most of the officials of the Glenwood Motor Car Co., which has purchased a 15-acre tract at Youngstown, on which will be erected a factory for the production of a car to be known as the Glenwood, are well known Cleveland business men.

B. J. Cline of this city is president of the corporation, and he is known in local automobile circles. T. D. Lamb, president of the Hess Body Co., is treasurer; Capt. R. L. Queisser of the R. L. Queisser Co., is secretary and William H. Graham, well known florist here, is a director.

The Glenwood Co. is a \$5,000,000 corporation with 50,000 shares of \$100 each preferred stock. There also are 200,000 shares of no par value common.

The company has under control an engine, which has developed what are said to be unusual features, but for the present Cline had no announcement to make about the car.

Edward E. Peake Resigns as K. C. Association Secretary

Kansas City, March 7—E. E. Peake, nationally known as secretary of the Kansas City Motor Car Dealers' Assn., and in the various capacities in which he has served dealer organizations, has resigned his office with the Kansas City association. He will devote his entire time to his real estate business and to the Kansas City Speedway, the project which is now well along towards realization. The Kansas City association will have as secretary George A. Bond, a successful retail merchant, later motor car dealer, and still later fine stock farmer.

MID-WEST REORGANIZATION

Indianapolis, March 5—A plan of reorganization under which the Midwest Engine Co. will obtain \$1,000,000 new working capital now is being worked out with every prospect of success. This new financing would place the company in a strong position where the ratio of quick assets to quick liabilities would be practically ten to one.

N. A. C. C. Hears Discussion on Used Car Situation

Interests Favor Cooperative Advertising, Appraisals, Guaranty and Shows for Trade-ins

NEW YORK, March 7—Members of the National Automobile Chamber of Commerce met here March 2 to discuss problems of importance to the industry. One of the most important was the used car situation. Several specific remedies were proposed.

One of the most comprehensive was presented through C. C. Hanch by Homer McKee of Indianapolis. It would provide for certified dealers who would be given certificates stating that they had agreed to put all used cars in such condition that they could be sold as certified cars. Under the plan a committee of manufacturers would be appointed to pass on rules under which the certified dealers would operate. There also would be a committee of four dealers in each locality, three of whom would not be interested in the car passed upon, but would be called upon to inspect each vehicle before it was offered for sale.

Opposition Develops

It developed at the meeting that there is opposition to attempts by factories to recondition their own product although the idea of having dealers do so is generally supported. Used car exchanges are favored but some doubt was expressed of their success. General approval was given to the proposal to have factories advertise the values of old models.

Both manufacturers and dealers favor cooperative used car advertising, selling cars with a guaranty and used car shows. Appraisals by individual companies in each locality are favored.

The directors were supplied with a mass of information on the used car question provided by questionnaires sent to 2500 representative dealers. Reports from practically every section of the country were that there has been a marked improvement in the demand for used cars and that the shrinkage in the number on hand has been rapid in the past two or three months. Nowhere is the used car problem any more acute.

The directors decided to adopt a standard safety code to be supplied motor car purchasers with their instruction books. Motor car operators will be told that they are engineers and that they have all the responsibilities of engineers.

A committee will be appointed to work with the Bureau of Simplified Practice of the Department of Commerce in standardization work as it relates to the elimination of needless sizes.

200% Increase in March Says Chapin of Hudson Co.

Predicts Full Time Production in Detroit as Result of Great Volume of Business

DETROIT, March 5—Hudson-Essex business in February will exceed business a year ago by 100 per cent, President Roy S. Chapin said today. Production in March will be increased to a point where it will run 200 per cent in excess of 1921, and will place the factory on practically full time operation. Releases on parts have been almost tripled in some instances.

Similar conditions are prevailing in almost every automobile factory in the city, Chapin said, manufacturers with whom he had talked declaring business to be far in excess of early expectations. Prospects were declared to be never better for a strong spring and summer business, with just an outside possibility that there would be a waiting list of buyers before long.

All shows are making remarkable successes, Chapin said, thus far not a poor show being reported from any section of the country. Attendance has been record breaking in most cities despite reported poor attendance at many other forms of attraction. This is a certain indication, Chapin declared, that public interest in automobiles is very strong.

The Hudson-Essex business in its new coaches has been large and the company feels very happy over their development, Chapin said. The campaign for business in the enclosed cars has worked out successfully and dealers are much pleased with the initiative of the company in working out a lower price enclosed vehicle.

The used car situation he declared to be amending itself.

ADOPTS SAGINAW PLAN

Toronto, March 8—With two exceptions, the members of the Toronto Automobile Trade Assn. have agreed to do business on the Saginaw plan of trade-in valuations. One of the dissenters declares he takes in, rebuilds and resells cars at a profit while the other claims that to make public the big initial year depreciation (approximately 43 per cent) as provided by the Saginaw plan would act as a serious sales resistant. The market in the first year depreciation, he declares, is far in excess of the service in intrinsic depreciation as it is in large part a vanity depreciation.

IOWA FARMERS IN MARKET

Des Moines, Ia., March 7—There is a break in the rather dark cloud which hung over the motor car horizon in Iowa during the past year. The month of February sees the most cheerful outlook which Des Moines dealers and distributors have encountered in many months and there is evidence that at last the

corner has been turned and that business conditions are on the upgrade.

Improvement in business conditions in general and better prices for farm crops in particular are credited for the better outlook of the trade.

While the recovery of the farmer and his return to the market is to be a slow process, there are evidences that he has already started back. An inquiry conducted by a dealer of the Chase-Nash Co., Des Moines, among 689 farmers in his territory elicited the information that of that number 87 made a definite statement that they would buy a new car this spring. Last year a similar inquiry was conducted by this dealer and of 712 farmers interviewed only 13 made such a definite statement.

Cadillac Salesmen Prove People Are Buying Cars

Boston, March 3—That there is business to be had Albion L. Danforth, head of the Cadillac forces in New England, proved to his fellow dealers when they learned what his men had accomplished, the facts of which came out when the entire Cadillac force had a dinner at the Copley Plaza. His sales for January were the largest for any January in the history of his company; it was the third largest month since the company has been organized; and the figures stood a total of 176 cars sold, 121 new models type 61, and 55 used cars. The total business rolled up was \$602,016.

STUTZ IMPROVES ENGINE

Indianapolis, Ind., March 3—A number of refinements have been made in the Stutz cars, particularly in the engine. It is claimed that the new manifold system adopted gives a 50 per cent greater power output from the same cylinder dimensions. According to Chester S. Ricker, who has been employed as consulting engineer by the Stutz company during the past year, the manifold is so arranged that changes in water jacket temperatures of 100 degs. do not seem to affect the operation. The chassis weight remains the same as on the previous series and the acceleration of from 10 to 60 miles per hr. is claimed to be quicker than from 10 to 50 in the previous series. Complete specifications and details of the new product will be announced to dealers in the near future and it is stated that the Stutz company is about to enter an intensive merchandising campaign.

GAS PUMPS CONDEMNED

Flint, Mich., March 3—Twenty-one gasoline pumps in Genesee county, condemned by state department of agriculture men in an inspection tour, were "short-changing" patrons a total of 50 gallons per day in deliveries amounting to 200 gallons, according to city sealer of weights and measures. In 13 towns in the county only 10 of 31 pumps were passed.

Ford's Competitor to be in Production by June 1

Durant's Long Island Plant Will be Used for Temporary Assem- bly—Name Unknown

NEW YORK, March 6—The new low priced car to compete with Ford will be manufactured on contract by Durant Motors, Inc., and will be in quantity production by June 1. It was announced today that this car will be turned out temporarily at the Long Island City plant of the Durant Motors of New York. The permanent factory site has not been determined. The first showing of the car will be at Washington tomorrow. The name of the car has not been disclosed.

Distribution will be in the hands of a company entirely distinct from Durant Motors. Details regarding stockholders in this company are not yet available but it is understood that parts companies which will supply units for the car will be given an opportunity to take stock. Responsibility of the Durant Motors for the new line will end when complete vehicles are turned out of the factory.

No steps have been taken towards the formation of a distributing organization but it is understood no exclusive territory rights will be given. While productions will be started on a touring model, the line ultimately will include models to match all those turned out by Ford, from stripped chassis to sedan. Prices will be identical with Ford prices. It has been decided it will not be possible at the price to include electric starter and demountable rims, but a generator will be included in the car. Detailed specifications are not made public.

The car will be powered with a red seal Continental engine and will have conventional automobile chassis plus Durant tubular backbone, semi elliptic springs and a Hotchkiss drive. Transmission will provide three speeds forward and reverse. Timken axles will be used and Timken bearings, front and rear. There will be a hand lever brake with good substantial brakes inside and outside on rear wheels. Gasoline tank will be located on rear and vacuum tank system will be used. There will be a one man top with a sliding windshield. Disk clutch will be used. Wheelbase will be slightly longer than used by Ford. Engine specifications not made public. Standard parts of high grade will be used throughout. Car will have the accessibility of Durant models which it is claimed will make service easy and not expensive.

MAIBOHM ASSETS SOLD

Toledo, March 5—A syndicate of Sandusky business men has purchased the assets of the Maibohm Motors Co. subject to the approval of the creditors. They hope to go forward under the present plan of operation.

21,059 Interested Persons Hear Ask-'Em-To-Buy Story

Automotive Equipment Association Is Operating 22 Films in as Many Circuits

CHICAGO, March 5—With a splendid record of accomplishment behind it, the Merchandising Department of the Automotive Equipment Assn., encouraged by results, is speeding up its campaign on "Ask 'Em to Buy." To date 248 meetings have been held at which 15,329 dealers, 3,570 salesmen and 2,160 others, including advertising men, students, etc., have been given the message dealing with better methods of merchandising. The total attendance at these meetings has been 21,059.

At the present time there are 22 of the films representing the progress of the successful accessory dealer at work in the United States and Canada. These films, either owned and loaned by the A. E. A. or owned and operated by manufacturers and jobbers, are being used in circuits. One circuit is in Ontario, Canada, while others are in Washington, Oregon, California, Utah, Wyoming, Idaho, Nebraska, Iowa, Louisiana, Mississippi, Tennessee, Arkansas, Florida, New Jersey, Indiana, Michigan, Ohio and New England.

Chicago headquarters is furnishing a number of speakers, while other field men are from manufacturers and jobbers. In some instances jobbers have selling end of the business and have sent them out as speakers. Edward C. O'Connell, assistant to Director Ray Sherman, has just returned from a speaking trip in Indiana. Other important meetings are: Indianapolis, March 3; Pittsburgh, March 10; Boston, March 15; Omaha, March 15; Newark, N. J., March 16; Decatur, Ill., March 20; Harrisburg, Pa., March 23, and the Texas Dealers Association meeting at Waco, March 23.

PLAN SERVICE ASSOCIATION

Philadelphia, March 5—At a meeting of automotive service men called by Capt. D. Risley, Jr., of the local Jordan agency at the Hotel Majestic, arrangements were made by the 13 men present to form a service association. A committee of three was appointed to co-operate with the Philadelphia Automobile Trade Assn. On this committee are Frank Homer, service manager of the Mack International Motor Truck Co.; Capt. D. Risley, Jr., service manager of Petersen Motors, Inc., and John J. Heinle, service manager of the Autocar Sales & Service Co.

DEALERS' BOARD OF TRADE

Springfield, Mass., March 5—Efforts to regulate the used car situation here have led to the forming of the Automobile Board of Trade, having this board of governors: R. M. Sauers, chairman;

John S. Harrington, F. A. Calderwood, E. R. Clark, W. C. Leonard. The board will maintain a regular office and paid secretary. A majority of the Springfield dealers have joined this organization, aiming to regulate used car purchasing by methods that distinguish the Saginaw plan. It is stated that Holyoke, Greenfield, Brattleboro (Vt.), and Keene (N. H.) are working in cooperation with the Springfield board.

Connecticut Trade Organizes to Fight Unjust Statutes

Bridgeport, Conn., March 3—In protest against unjust legislation, which its members claim was enacted during the last Connecticut legislative session, when burdensome and oppressive motor vehicle laws, affecting not only owners of cars but every branch of the industry, were made effective, the Connecticut Motorists Protective League, organized in this city and with headquarters here, has inaugurated a campaign throughout the state for membership, who will act in unison in opposing the issue. Temporary headquarters have been established in room 611, Security building, this city. W. F. D. Kilpatrick is president of the organization and Hugh Murphy, vice president and treasurer.

The new association has been quietly at work throughout the state among the trade and it is reported that already more than 60 per cent has become affiliated. It is expected that by April 1 the trade will be organized 100 per cent. Thus far but little pressure has been brought upon the owner of passenger cars, but the association has now inaugurated a campaign to invite membership from these ranks. It is hoped to have every car owner ultimately enrolled.

DALLAS SALES INCREASING

Dallas, Texas, March 3—The actual retail sales in the automotive trade at Dallas during the month of February showed a considerable increase over those of the first month of the year, and the January sales showed an increase over those of December. Dealers report that the actual sales for February were 20 per cent above those of January. This big increase is due partly to the annual spring automobile show, the dealers said, for a large number of cars were sold during the show, and as a direct result of it. But without the show the dealers said there would be a slight increase in the trade.

S. A. E. SUMMER CONVENTION

New York, March 3—The Society of Automotive Engineers will hold its 1922 summer meeting at White Sulphur Springs, W. Va., June 20 to 24. There will be the usual sports and entertainment in addition to the technical program. The S. A. E. expects to get a round trip railroad rate of a fare and a half for the convention.

Willys-Overland Notes Are Extended for Thirty Days

Bank Interests Seeking Control Through Mortgage Bonds Seem to Have Lost

NEW YORK, March 3—Bank loans of the Willys-Overland Co., aggregating \$16,556,000, which matured Feb. 26, have been renewed for three months.

This development is the most important in the recent history of the company. It indicates that the bank creditors who proposed to keep control by a \$25,000,000 refinancing program based on mortgage bonds have been defeated by the other interests in the company. Any refinancing program must be submitted to the preferred stockholders and it now is considered doubtful whether any attempt will be made to mortgage the property.

By the election in the past 10 days of six Toledo bankers and business men as directors of the company, nine of the eleven members of the board are residents of Toledo. The only representatives of the New York and Chicago bank creditors left on the board are J. R. Harbeck and Elisha Walker, of this city.

The fact that control of the company has been shifted to Toledo is evidenced by the announcement that the executive offices which have been maintained in New York for years will be removed to Toledo and that John N. Willys, president of the company, will devote practically all of his attention to Willys-Overland. When he is not on the road promoting sales he will be at Toledo.

The significant announcement also is made that Willys has severed connections with practically all his other interests. While official information on the subject is lacking there is reason to believe that this means his early retirement from the Republic Motor Truck Co., of which he has had control, but which now is virtually in the hands of its creditors.

No definite date has been fixed for closing the executive offices here and little is known about what will be done with the personnel of the New York organization. It is assumed that all the officers of the company will be taken to Toledo.

Another important development in the affairs of the company was the election of Charles B. Wilson, who has been vice-president in charge of operations at Toledo, as general manager. He thus succeeds Walter P. Chrysler as the most powerful influence in the company next to Willys himself.

Wilson is very highly regarded by the Toledo directors, and he was made general manager at a meeting which was not attended by Willys, who is absent on a long trip.

Extension of the bank notes for three months is something of a surprise. It

was reported last week that the new directors had been given 30 days in which to consider the bankers refinancing program. The Toledo bankers, who would be glad to take over all the bank indebtedness if they could do so, are said to favor a continuance of the policy under which the loans have been reduced by 10 per cent payment in cash from time to time and it is believed they will insist upon this plan.

In a statement Willys says:

"We are entering a selling season with every reason to expect big business. We have put into operation an improved marketing plan. More than 3,500 live dealers have contracted with us, and early this spring we hope to have at least 5,000 dealers."

OVERLAND REDUCES PRICES

Toledo, March 5—Effective immediately Willys-Overland, Inc., has made price reductions on Overland and Willys-Knight cars as follows:

Overland—	Old	New
Roadster	\$ 595	\$ 550
Touring	595	550
Coupe	850	Same
Sedan	895	Same
Willys-Knight—		
Roadster	1475	1350
Touring	1525	1375
Coupe	2195	1875
Sedan	2395	2095

GARY TRUCK PRICE INCREASE

Toronto, Ontario, March 3—Increases in the prices of all its models are announced by the Gary Motor Truck Corp. of Canada, Ltd. The schedule follows:

	Old Price	New Price
Model F 1¼-1½ ton.....	\$2100	\$2600
Model I 2 ton.....	2550	2900
Model J 2½ ton.....	3150	3800
Model K 3½ ton.....	4050	4900
Model M 5 ton.....	5150	5900

The Gary Express 1 ton is priced at \$1495.

ACASON LOWERS PRICES

Detroit, March 3—The Acason Motor Truck Co. has made material reductions on its heavier models. The list follows:

	Old Price	New Price
¾ ton	\$1650	\$1650
1½ ton	2485	1950
2½ ton	3295	2750
3½ ton	4295	3450
5 ton	5250	4350

The one-ton model which sold for \$2260 has been discontinued.

DIXIE FLYER LOWER

Louisville, Ky., March 3—The Kentucky Wagon Co. has reduced the price of the various models of Dixie Flyers as follows:

	Old	New
Touring	\$1195	\$1095
Roadster	1195	1095
Coupe	1895	1545
Sedan	1895	1595

Gray Motors Officials Back New \$10,000,000 Taxi Co.

Concern to Manufacture Cabs for About \$1,200 and Establish Operating Organizations

DETROIT, March 5—A company capitalized at \$10,000,000 soon will be incorporated in New York state to manufacture a standard taxicab which will sell for approximately \$1,200.

Identified with the new enterprise will be Frank L. Klingensmith, president of the Gray Motor Corp., and Frank F. Beall, his associate in that company; H. T. Hanover, president of the Apex Motor Corp., and Nat Jacoby, who is now at the head of the Black and White Cab Co., of New York.

The new corporation will be entirely separate from Gray Motors.

The plans as outlined call for a vehicle from which will be eliminated all unnecessary equipment and attachments. The cabs will be manufactured and operated by the company. A plant already has been located. The operating end of the business will be under the direction of Jacoby.

Connected with the new enterprise will be four automotive engineers who have made a careful study of the taxicab question. It is understood that the vehicle will be an engineering product rather than an assembled one. Operations eventually will be carried on in all the large cities if the plans of the corporation mature.

U. S. Attorney Kun Hits Hard at United Auto Stores Head

Philadelphia, March 3—Assistant United States Attorney Kun has petitioned the court for a receivership in equity for the United Guaranty Corp., the stock-selling agency for the United Auto Stores, Inc. Judge Thompson fixed Wednesday of this week as the date of a hearing.

Kun will seek to have the receivers for the United Auto Stores, Inc., not only made permanent receivers, but also receivers for the United Guaranty Corp. He asserts that Carrier's defense of the United Auto Stores as "solvent" is "either consummate gall, or pitiful stupidity," and declares the stockholders who bought \$2,500,000 worth of stock will be lucky if they ever get back one cent. To show how "solvent" the concern it, Kun asserts that the company is unable to pay a \$60 freight bill, owes a large sum for rent and \$3,000 for back salaries, and that he has had to ask to borrow \$5,000 for the company, so some of the stranded salesmen in different parts of the country may be paid. Kun declares there is only about \$20 in the treasury.

I. H. C. RAILWAY STARTS IN MARCH

Fort Wayne, Ind., March 3—Representatives of the four local railroads which are interested in the construction of the belt line for the new International Harvester Co. plant in this city have announced that work on the construction of the road will start on March 6.

BEEMAN LOWERS PRICE

Minneapolis, March 3—The Beeman Tractor Co. of this city has reduced the price of its Model G to \$240. This company now makes a smaller model known as Beeman Jr. which sells for \$180.

DUPLEX 4-WHEEL DRIVE PRICE

Lansing, Mich., March 4—The Duplex Truck Co. has lowered the price of its 4-wheel drive truck \$750 or from \$4,250 to \$3,500.

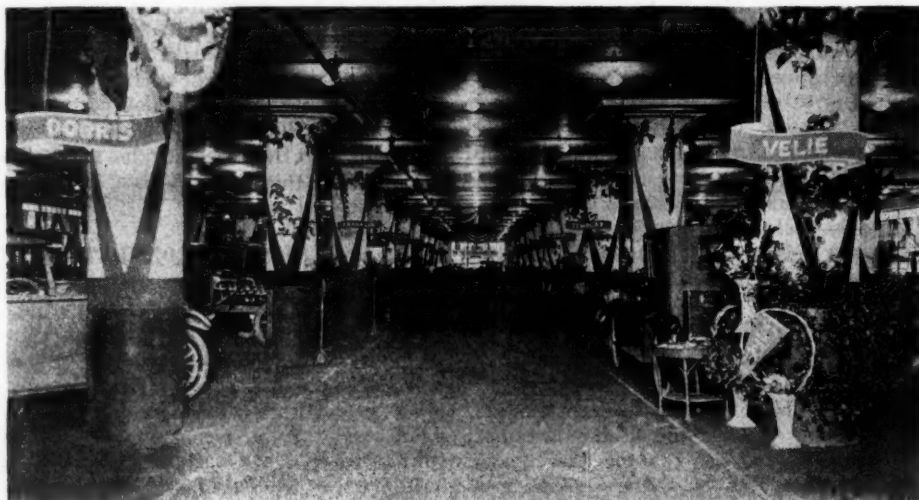
ARO TRACTOR LOWER

Minneapolis, March 3—The Aro Tractor Co. has reduced the price of its model E tractor from \$450 to \$385 f.o.b. Minneapolis.

WETMORE TRACTOR REDUCED

Sioux City, Ia., March 3—The price of the Wetmore tractor has been reduced from \$1585 to \$1185.

St. Louis Show Beautifully Staged



Increasing Sales At All Shows

PRAISE FOR COLUMBUS SHOW

Columbus, Ohio, March 4—The annual automobile show, held under the auspices of the Columbus Automobile Show Co., which ended Feb. 8, was a success in every particular. The idea of having a "split" show, which was carried out, was a novel one and it was not known whether it would prove popular, but the attendance was boosted as a result of having open cars only for the first three days and enclosed cars only during the last three days.

Anson B. Coates, the manager, was very enthusiastic over the show. He reports a large number of sales and the booking of innumerable prospects. Out of town prospects were probably as numerous as in any former year.

The show is expected to stimulate trade in every branch of the automotive business. Passenger cars and trucks are expected to sell better as the spring opens up. Accessories are showing some life and the show, apparently, has stimulated trade in that line.

FLINT SHOW SALES

Flint, Mich., March 4—Nearly 300 cars were sold on the floor during the third annual four-day Flint automobile show, while declarations of intention were received from a thousand other prospective buyers, according to conservative estimates, following the show which closed with a total record breaking attendance of more than 20,000.

Flint Auto Dealers' Assn., under the auspices of which the show was staged, feels that the public appreciated its efforts and that the show was worth while from a business stimulating standpoint.

LOUISVILLE SHOW BEST EVER

Louisville, Ky., March 3—Every sixth person in Louisville visited the Louisville Automobile Show.

A little more than \$1.50 per capita was spent at the exhibit.

Figures compiled by officials show that 232 automobiles were sold during the week at an estimated valuation of \$433,000. This figure was compiled from an accurate poll of 25 of the 31 dealers exhibiting cars.

The other six, according to estimates, sold at least 30 to 40 additional cars.

Accessory dealers, of which there were 65, sold approximately \$40,000 worth of goods. This figure may go higher when the final tab is completed, it was announced, making the total sales \$473,000, setting a new high record for Louisville.

The total attendance for the week was 45,500 persons, or more than 15,000 in excess of any show held in Louisville.

SPRINGFIELD SHOW

Springfield, Ill., March 3—The second annual three-day show of the Spring-

field Automobile Dealers' Assn., which closed Feb. 25, was an unqualified success from all angles.

Local dealers are enthusiastic over the outcome of the exhibition which was entered into with some slight misgivings on the part of some, due to an experience of sluggish buying for several months. Now, as a result of the show, it is believed that spring sales will show a healthy increase.

Department Store Stages Show

Cleveland, March 3—The May Co.'s third annual automobile show was held the week of Feb. 25-March 4.

The show has become an institution here, and the management of the store and manufacturers and dealers here look forward to the exhibit as one of great mutual benefit.

The May Co. store is one of the largest in the city and the proprietors arrange for the exhibit on a large scale, with the result that thousands of persons are attracted to the store during show week, and most of these would not have entered except for the special attraction.

The company limits the exhibits to Cleveland made cars. The exhibits included the following cars: Peerless, Jordan, Templar, Grant, Chandler, Cleveland, Winton, Ferris, Kurtz, Stearns and Merit.

DECATUR PLANS SPRING SHOW

Decatur, Ill., March 8—Decatur automobile dealers are urging a spring car display here and propose a show about the middle of March. Guy Deetz, president of the Decatur Automotive Assn., is supporting the move not only as a great move to stimulate interest in automobile buying but to advertise the city as well. Search for a suitable location is under way and canvass of dealers has shown an almost unanimous approval of the project.

LONDON SHOW SUCCESSFUL

London, Ont., March 6—With 26 makes of cars, most of them in several models, and a score of automotive equipment and supply displays, the London Motor Show, which closed Feb. 12, was not only the best motor exhibition ever held in the Forest City, but the largest and most comprehensive ever held in a city of anywhere near London's population in the Dominion.

FORD PRODUCING 3400 CARS

Detroit, March 7—The Ford Motor Co. is operating at the rate of 3400 cars a day on a four-day week schedule. The March schedule calls for between 60,000 and 65,000 cars.

GOOD SHOW AT FT. WAYNE

Fort Wayne, Ind., March 3—Following the great success of the annual automobile show in this city recently, at which there was on one day an attendance greater than during the entire week of last year's show, the members of the Fort Wayne Auto Trade Assn. staged a two weeks' used car show in the Barnes building, where the original show was held.

ROCKFORD SHOW PROGRAM

Rockford, Ill., March 6—Preparations and program for the annual show of the Rockford Auto Dealers' association in Shrine temple, March 8-11 are being completed. Effort is being made to secure Eddie Rickenbacker, American ace, as speaker at a banquet tentatively scheduled as concluding event of the exhibit.

FORT WAYNE SHOW

Fort Wayne, Ind., March 7—The annual automobile show under the auspices of the Fort Wayne Auto Trade Assn. held Feb. 18 to 25, was easily the best show ever staged here and stood up well with previous shows in the number of sales made and prospects secured by the dealers.

FINE SHOW AT SPRINGFIELD

Springfield, Mass., March 3—The seventh annual automobile show under the auspices of the Springfield Automotive Dealers' Assn. has proved the largest and most attractive of the series, and is rated as an emphatic success from the viewpoint of interest, prospects and sales.

HOOSIER SHOW OPENING

Indianapolis, March 5—The Indianapolis show opens March 6 and runs to Saturday evening, March 11. More exhibits than ever and a state-wide interest promises to make this the most successful "spring show" given here in recent years.

DE PALMA'S NEPHEW ENTERS

Indianapolis, March 5—After two years tutoring by America's most popular driver of racing cars, Peter DePaolo has forsaken the shelter of his Uncle Ralph DePalma and started his career as a driver of fast cars in the Washington's Birthday races on the Los Angeles speedway. Peter and John DePaolo have been members of the crew of Ralph DePalma and the Ballot in the last two Indianapolis 500-mile events.

His first race was at the wheel of one of Louis Chevrolet's Frontenac racers, and DePaolo says that he expects to enter the May 30th event and has requested an entry blank.

CONCERNING MEN YOU KNOW

A. E. Creeger, formerly of the Nash Toledo Co., has become sales manager of the Landman-Griffith Co., Toledo distributors for Maxwell, Chalmers, and Lincoln cars in that territory.

Harrison H. Boyce, general manager of the Moto-Meter Co., Inc., and E. V. Hennecke, sales manager, are making a tour of the entire country, investigating trade conditions in the automotive accessory field. The trip is taking in all the principal centers of distribution, and the investigation will extend over a period of approximately two months.

Walter Sinclair has been appointed used car manager for the Philadelphia Nash Motor Co.

Carlisle Tire Corp. announces that Charles Hughes Connelly, formerly western sales manager of the Miller Rubber Co., became general sales manager of the Carlisle Tire Corp., March 1.

B. F. Metcalf, employment manager for R. & V. Motor Co., East Moline, has resigned his position and will leave in a few days to take up duties in Mexico in connection with the Rockefeller foundation. Metcalf has been with the R. & V. Motor Co. six years. New headquarters will be in Vera Cruz.

Lake Jones has been named district manager in charge of the Atlanta branch for the Ajax Rubber Co. He has been connected for some years with the Goodyear Tire & Rubber Co., both at the factory and as branch manager at St. Louis. He was formerly a sales efficiency expert with the Miller Rubber Co.

J. Mitchell Austin, for the past nine years salesman of Chandler and Marmon automobiles in Nashville, has gone with Whiteman-Kirkpatrick, distributors for Exide batteries for Nashville and Middle Tennessee.

George Harrison Phelps, for eight years director of advertising for Dodge Brothers, has organized his own company and will henceforth conduct a general advertising service under the name of George Harrison Phelps, Inc.

George J. Pink, of Pink & Blackburn, Ottawa, Ont., distributors of McLaughlin cars, has been unanimously elected president of the Ottawa Central Canada Exhibition. He is also appointed chairman of the standing committee of the automobile section.

L. J. McCracken, who has been for several months local sales manager at the Willys-Overland, Inc., branch in Toledo, has been assigned to the Pacific coast as district manager and will take up his duties at Los Angeles next week.

Henry H. Erhardt, secretary and treasurer of the A. J. Monday Co., Milwaukee, manufacturer of passenger car and motor truck bodies, died Feb. 16, at the age of 54 years.

P. W. Hollister, president of the Hollister Auto Co., Oshkosh, Wis., and a pioneer in the Wisconsin lumber manufacturing industry, died Feb. 19, at the age of 63 years.

M. W. Tucker has been made manager of the Martin-Parry Corp.'s branch in Kansas City, established for distribution to dealers in Kansas and parts of Missouri, Arkansas and Nebraska.

Detroit Dealers Open Club Rooms in Hotel Addison

Detroit, March 3—The Detroit Automobile Dealers Assn. will open new headquarters in the Hotel Addison March 7 which will provide a permanent home for the organization with facilities for all activities and will also give members a downtown meeting place at all hours of the day. Noonday luncheons will be served daily, a feature that Manager H. H. Stuart of the association has been working for for several years. The offices will also be headquarters for the Michigan Automotive Trade Assn.

The new rooms consist of a large dining room and two lounge rooms in one section which can be combined to form a meeting room with accommodations for 300. Dealer members of the State association are invited to use the rooms whenever they are in Detroit and hotel accommodations will also be provided for out of town members upon notice.

Business offices of the two associations will be located across the lobby from the lounge rooms. The acquisition of the hotel rooms will make it unnecessary for the association to locate a club house, a plan which has been under consideration but held up on account of the expense. With a place to hold committee meetings, conferences of heads of service and sales departments and other necessary business, the association feels the interests of members will be much advanced.

MICHIGAN SCHOOL USES FILM

Detroit, Mich., March 4—Michigan State Auto School will introduce the "Ask 'Em to Buy" film of the Automotive Equipment Assn. as part of its school course beginning at once. Every second month

the school plans to show the film with the accompanying lecture as of vital importance in instructing future garage owners and mechanics in successful business methods.

The film was shown for the first time last week with T. T. Allen of the Class Journal Co. advertising staff as lecturer, to the 700 students at the school.

TIRE PRODUCTION FIGURES

New York, March 7—Production of pneumatic tire casings for 1921 totalled 21,820,041, according to statistics supplied the Bureau of Foreign and Domestic Commerce by the Rubber Assn. of America with the figures for December not exact. The estimated production for December was 1,840,000 an increase of about 100,000 over November, but shipments were 1,980,000 as compared with 1,342,519 in November. Inventories fell off about 200,000.

Inner tube production in December was 2,070,000 as compared with 2,126,211. Shipments of inner tubes in December increased nearly 1,000,000 over the previous month, however, while inventories were reduced from 5,203,000 to 4,731,000.

NEW FREEPORT ASSOCIATION

Freeport, Ill., Feb. 24—Virtually every automobile dealer and garage man is enrolled in the Freeport Automotive Trades Assn., organized here recently. Officers are: President, M. L. Miller; secretary-treasurer, A. F. Smyth; vice presidents, Charles Noeske, W. C. Willumsen, LeRoy Kunz, Louis Sanders, H. H. Ohlendorf, H. C. Montague, E. L. Otto.

Each vice president is chairman of some division of club activity and in the respective order these groups are classified: New car, repairs, accessory, tires, battery, used car and storage.

Accessory Manufacturers Report Better Business

Credit Men of Representative Companies Find Conditions Considerably Improved

NEW YORK, March 3—Further evidences that motor and accessory manufacturers are receiving substantial orders was given by a group meeting of credit men from representative companies. The increase over recent months probably averages about 30 per cent. Following are paraphrases of some of the reports made at this meeting:

"Small local truck builders appear to be very active, especially in the east. We have received many small orders from builders of this type."

"One of our customers in the south who had a large account with us and whose notes we had carried for a year and a half recently paid us 20 per cent on account."

"New business is being placed for future delivery. We believe orders will increase from month to month."

"We have been very much surprised in the last month at the great number of inquiries we have received for our new plant equipment and at the quantity of replacement business we have been able to get. These orders have not come from companies which are just going into the field but from old line plants which are replacing worn out machinery."

"We did have a good month, February, and March will be a good month."

"Our schedules up to July are about 50 per cent."

"We are very much more active than we have been. As far as our automobile business goes we have specifications from practically all our customers up to July."

"We think we see a little change for the better in the western agricultural districts and we are looking for different conditions than have prevailed in the past year."

E. & B. CO. MAKES STATEMENT

Rockford, Ill., March 8—The Emerson-Brantingham Co., engaged in the manufacture of farm implements, in the fiscal year ending Oct. 31, 1921, suffered a net loss of \$3,308,726. This, however, reduced \$467,523 to \$2,841,192 by profit credited to the retirement of preferred stock during the year, the amount being the difference between the cost and par value of the stock.

The company's deficit absorbed the surplus of \$2,562,857, which the company had on hands at the start of the fiscal year and resulted in the impairment of the company's capital account to the extent of \$278,345. In this showing the company has taken its losses in full. The outlook for the company is said to be favorable.

IN THE RETAIL FIELD

Reilly-Herz Co., Minneapolis, Minn., northwestern distributors of Maxwell, Chalmers and Elgin cars, has moved to a new location. C. R. Reilly, president, says that the new location provides almost double the floor space of the former building.

Golden State Motors Corp., organized to handle the distribution of the Leach Power Plus Six and at least two other well known makes of cars in California, has been completed. The headquarters of the new company, capitalized for \$500,000, will be in Los Angeles, but branches will be established in the principal cities of the state and a strong sales personnel now is being gathered.

Major W. P. Jernigan, J. A. Jernigan and W. D. Mathis have purchased the controlling interest in the Union Motor Car Co., Memphis, Tenn., one of the largest automobile companies of Memphis, distributors of the Locomobile, Jordan and Mercer cars.

E. C. Winters and C. Y. Oliver are opening in February a new modern auto garage in Wiona, Miss.

Independent Tire Co., at Memphis, Tenn., have moved to its new location on the Automobile Row of the Bluff City.

Manley Bros. Garage property in Brattleboro, Vt., has been acquired at a price of \$50,000 by interests that conduct the Brooks House, and will be run in connection with the hotel.

Roy S. Bridge, formerly with the R. L. Mack Co., Pittsfield, has been appointed assistant general manager of the Springfield, Mass., Cadillac Co.

515 Tire & Vulcanizing Co., Memphis, Tenn., has moved into new quarters. They handle Miller tires and Cooper batteries.

F. Hornberger, A. V. Horsley, and T. A. Roache have formed a partnership and opened a new battery service station at Freeport, Ill. They will specialize in electrical repair work of all kinds.

Holderman Auto Repair Co., Toledo, has taken over the sales and service for Master and Fugol trucks in the northwestern Ohio territory.

Quincy Velie Co. has been assigned Illinois territory for the Wills Sainte Claire car, which will be shown in the April style exhibit. The Quincy territory was assigned by the McNiece-Hill Motor Co. of St. Louis.

John C. Baggott has been appointed manager of the Earl Philadelphia Motor Car Co. John R. Thomas has been made his assistant and Charles Longstreth the service manager.

R. T. Casell, Jacksonville, Ill., has been appointed distributor for the Essex and Hudson cars in the Morgan county territory, and will have his sales agency on the west side of the public square. Casell was formerly in the same business in Jacksonville, but retired a year ago.

A. H. Niemann has purchased the garage and sales agency of Herbert Saathoff, located at the corner of State and Edwards streets, Litchfield, Ill., and will add the Delco farm lighting system agency to the former business.

D. J. Kerrigan, Minonk, Ill., will open a tire and accessory store at Wenona, Ill., on April 1.

Frank Holcomb, of Fairfield, Ia., has rejoined the Cedar Rapids Oakland Co., which has taken new quarters in the building vacated by the Simmons Motor Sales Co. H. A. Kesseling, formerly chief electrical instructor in the American Auto school, Omaha, will have charge of electrical work in the newly enlarged service station.

G. O. Sullivan, who recently purchased the Oscar Peterson Garage, Kenosha, Wis., has been appointed Jordan dealer in Kenosha county.

Zeaman Motor Co., Wisconsin Rapids, Wis., is a new Chevrolet dealer.

Elmer Thompson and Alfred Clipper, partners in the garage and repair shop business at Taylor, Jackson county, Wis., have filed a voluntary petition in bankruptcy, scheduling liabilities at \$15,735 and claiming assets of \$11,175.

Mayville Auto Co. is a new corporation formed at Mayville, Wis., with \$50,000 capital, by Philip, Leo and Ernest Bachhuber. It will do a general sales, service and public garage business.

J. M. Osborn, Waupaca, Wis., contemplated the erection of a new public garage, sales and service building, 58 x 110 ft., two stories, costing about \$32,000.

Jonas-Cadillac Co., Milwaukee, Cadillac dealer, has increased its capital stock by an issue of \$100,000 of preferred stock, additional to 2,000 shares of common stock having no par value.

Klinger Buick Agency, Watertown, Wis., owned and managed by Fred J. Klinger, will build a two-story fireproof garage and service building, 56 x 100 ft.

Peter Chadwick has purchased the Dundee garage at Dundee, N. Y., from Ralph Bartholomew and P. M. Chadwick.

A. V. Phillips has bought the Cadillac garage in Pittsfield, Mass., and will remodel and enlarge it for the use of the Pittsfield Cadillac Co. He will continue to conduct the City Garage & Sales Co.

Commercial Aviation Lines Lose \$430,000 in 18 Months

French Companies Despite State Subsidies Fail to Meet Financial Success

PARIS, Feb. 29—A dead loss of 4,982,645 francs (about \$430,000 at present exchange) was incurred during 1920 and the first six months of 1921 by eight companies running regular passenger and freight air lines in France. This loss has to be faced notwithstanding the fact that the companies received important state subsidies totalling 14,587,408 francs for these 18 months. Without these state subsidies the loss would have been 19,570,045 francs, or approximately \$1,700,000.

During the first half of 1920 the length of air lines in regular operation was 2273 miles; this was increased to 3723 miles during the second half of the year, and to 4107 for the first half of 1921. Account is only taken of successful trips; a plane which breaks down on its journey, or does not complete the flight within a time limit, is considered as not having started.

On the French lines a certain number of officials are entitled to free passage on the subsidized planes. The following figures show the total number of passengers carried during a period of 18 months, and differentiate between paid and free passages:

	Paid Passages	Free Passages
First half 1920	239	181
Second half 1920	741	548
First half 1921	3430	331
Total	4410	1560

The amount of freight carried, exclusive of mails, was 31,014 pounds in the first half of 1920; 76,684 pounds in the second half of the year, and 149,843 pounds in the first half of 1921, making a total of 527,541 pounds for the period of 18 months.

In 1921 eight incorporated companies and one privately owned concern were operating regular air lines in France. The nominal capital of the former was 24,120,000 francs, of which 19,120,000 was paid up. The direct income of these eight concerns was 2,265,722 francs for a period of 18 months; and their operating expenses 21,835,767 francs. With the state subsidies of 14,587,400 francs, the loss on the 18 months' working was reduced to 4,982,645 francs.

CHAIN CO. IN PRODUCTION

Buffalo, March 4—The Pyrene Mfg. Co. of New York City, which controls a majority interest in the Off and On Chain Corp., secured three buildings from the Wickwire Spencer Steel Corp. and has transformed them into a chain making plant and is already in production.

Ford Dealers Test Locks to Baffle Thieves in Chicago

Chicago, March 6—A committee, appointed by and made up of, members of the Chicago Ford Dealers' Assn., recently held an automobile lock contest at the Ford plant here. The testers were insurance representatives, interested in the reduction of theft of Ford cars in Chicago, where, it is said, stolen Fords make up the majority of reports to the police.

O. P. Alford, one of the testers on the insurance investigating committee, said many of the locks put on the market, before hard study had been given to the development of this point of automotive equipment, were nothing more than makeshift affairs which could easily be opened in a few seconds by the skilled and even the unskilled thief. He added, however, that the test at the Ford plant brought out many improvements and that the Decker, Seng, Star, Hugro and Bower locks had met with the approval of both the dealers' committee and the insurance men.

Among the tests which the locks were put to was a 10-minute picking try, during which every possible sort of pick, from a match to the especially made burglar tool, was used. Hammers, chisels, screw drivers and various other instruments were also used. The time required to open these locks varied from 18 to 20 minutes.

BOSTON CADILLAC DINNER

Boston, March 7—The salesforce of the Cadillac Automobile Co., of Boston, and those of affiliated dealers in eastern Massachusetts cities had a dinner at the Copley Plaza. It was a celebration bringing to an end the competitive sales of teams from all organizations outside the Boston office, which was won by that headed by James Toohey, of Lawrence. The losing team, under F. H. Van Blarcom, of Lynn, had to pay the bill. President Albion L. Danforth, of the Boston organization, presided, and gave a talk on what he had observed during a visit to the Chicago motor show.

BUSINESS NOTES

Mar-Tan Motor Mfg. Co., Milwaukee, has had a charter awarded it with incorporation papers of \$125,000, to engage in the manufacture of motors, engines and machinery. A. E. Martin is president.

Champion Ignition Co., of Flint, Mich., becomes the A. C. Spark Plug Co. on April 1.

Jordan Motor Car Co. issues a statement showing production for February, 1922, to be 35 per cent better than for that month, 1921.

Motor Wheel Corp., Lansing, Mich., will open a Detroit office on April 1, with M. W. Taber in charge.

Burdick Tire & Rubber Co., Noblesville, Ind., has had no petition for a creditors' committee filed against it, according to Judge Anderson in Federal court at Indianapolis.

Arnold Grinding Attachment Co. has been established at Flint, Mich.

Sieberling Cord tire will make its bow to the American motoring public during the week of April 3.

Federal Rubber Co. has opened a branch in Philadelphia to take care of Pennsylvania territory.

Visible Pump Co., Fort Wayne, Ind., which is moving to Findlay, O., has leased the former property of the Grant Motor Co. at Findlay and will begin operations there within a month.

Elgin Motor Car Corp. reports that its shipments for January were 200 per cent better than for December, and that February shipments have been 35 per cent better than January. The production for March calls for 300 cars. The company recently has closed contracts with five large exclusive distributing organizations and seven direct dealers.

George W. Hanson, president of the Hanson Motor Co., Atlanta, Ga., announces that the company has absorbed the American Motors Export Co., of Jacksonville, Fla., and that the two industries have been merged. The joint company, which is to be known in future as the Hanson Motors Co., will maintain headquarters in Atlanta and also operate a plant that is now being constructed at Jacksonville.

Ford Motor Car Co. of Canada has increased its manufacturing schedule to five days a week of eight and three-quarters hours each. It is turning out 218 cars a day. There also has been an increase in the parts business.

Wayne Oil Tank and Pump Co., Fort Wayne, Ind., is constructing a service station and warehouse in the heart of Philadelphia's auto row.

The company will break ground within a few weeks for the new \$75,000 office building here.

Transport Truck Co., Mount Pleasant, held its annual meeting on Feb. 22. All officers were re-elected.

Sieberling Rubber Co., Akron, O., has established a branch in Kansas City, with R. L. Richey as manager. The Kansas City house will distribute to Nebraska, Missouri, Kansas, Oklahoma and part of Nebraska.

Mason Tire & Rubber Co., of Kent, Ohio, has booked orders from Henry Ford for from 15,000 to 20,000 tires a month. The company plans to double its production.

Joseph H. Lieb, operating as the Lieb Motor Co., Smithville, Clay Co., Mo., automobile sales and service, has filed bankruptcy petition in the Federal court at Kansas City.

Pack Battery & Equipment Co., Kansas City, Mo., adjudicated bankrupt Jan. 18 following involuntary petition, has filed schedules, by O. C. Pack, president, showing total liabilities of \$75,747.22, assets are not given in detail nor totaled.

Replacement Parts Co., Kansas City, adjudicated bankrupt in Federal court Feb. 11, has filed its schedules, showing \$64,714 secured claims and \$58,099 unsecured. The company's real estate at Sheffield, the plant, is listed as \$50,000; stock in axle business, inventory, \$18,698; machinery and tools, \$82,083; office equipment, \$1,213, and accounts receivable, \$4,841; total assets, \$158,267.35.

United Automotive Body Corp., Tilton, Ill., has had Victor Yeomans appointed as its receiver.

Dual Tractor & Truck Co., defunct, of Decatur, Ill., has been reorganized by stockholders as the Decatur Machine & Specialty Co.

Penny-Buick Co., Greenville, S. C., has let contract for a new building, brick and stone, 150x100 feet, to cost about \$35,000.

Dean C. Throckmorton has been named receiver for the Gary-Varnier Truck Co., Columbus, Ohio, upon the application of the Sixteenth Street Bank of Chicago, which holds a claim of \$4,014.

Stevenson Gear Co., Detroit, will install a plant for the manufacture of gears by its multiple shaper method in the factory of the Michigan Pattern Machine Co. Substantial orders are reported from a number of companies and production will be started at once. By its lease the company will have the use of \$200,000 worth of machinery, in addition to its multiple shaper equipment.

officers of the Union Transportation Co., the J. G. Brill Co. and the White Motor Co., were passengers on the trial trip.

Officials of the railroads expressed themselves as pleased with the test and said the car would aid materially in cutting down expenses on lines now running at almost a loss.

TAX CLAIMS AGAINST LINCOLN

Detroit, March 9—No explanation is obtainable here of the new claim for \$6,000,000 filed by the United States government against the Detroit Trust Co. as receiver for the Lincoln Motors Co., which recently was purchased by Henry Ford for \$8,000,000. The only statement from Washington is that the claim arises out of War Department contracts. Neither Henry M. Leland, president of the company, nor Ralph Stone, president of the trust company, are able to explain the claim.

TRUCKS REPLACE ICE WAGONS

The Knickerbocker Ice Co., New York, is advertising 50 used wagons for sale, as the company is substituting automobiles for horse-drawn vehicles.

G. M. C. Consolidating Efforts Through Sale of Six Plants

Efficiency in Production to Follow Disposal of Properties Is Corporation's Aim

DETROIT, March 4—The General Motors Corp. will sell, through its real estate department, six plants formerly occupied by divisions of the corporation as part of its plan of consolidating activities. The plants listed for sale are:

The former Cadillac plant, Detroit; the Frigidaire Corp. plant, Detroit; Michigan Crankshaft Co. plants at Lansing and Saginaw; the International Arms & Fuse Co. plant at Bloomfield, N. J.; a plant built by the Champion Ignition Co. at Brantford, Ont., which never was occupied.

The statement by the company relative to the sale says:

"In readjusting its business to conform with new plans providing for still greater efficiency in production, the General Motors Corp. has found it desirable to consolidate some of its manufacturing operations. As a result of this development, five plants formerly operated by the corporation are now being placed on the market. The number is small when viewed in relation to a business consisting of 78 divisions, subsidiaries and affiliated companies.

"The plants now being offered, subject to prior sale, are all in good condition and were operated successfully within the last year. They provide a wide range of selection with respect to location, size, character of construction and cost.

"To avoid holding factory property in a non-productive condition the corporation is prepared to sell any or all of the five plants at prices below carefully made appraisals."

The floor space of the plants aggregates 418,712 sq. ft.

In addition to the plant sale, the corporation will sell a factory site of 60 acres in Grand Rapids.

PAN-AMERICAN SALE

Decatur, Ill., March 4—Judge Baldwin in the circuit court has issued an order for the public sale of the Pan-American Motors Corp. Edward Danner, president and receiver, denied that the corporation was insolvent and that efforts of the directors to dissolve the company, were unsuccessful because they lacked the necessary two-thirds vote.

Unless some one buys the plant with a view of continuing operation, the Pan-American Corp. will pass out of existence. Apparently there is nothing left but to realize the largest amount of money possible for the benefit of the stockholders.

Gasoline Car Demonstrates Fitness for Short Hauls

Philadelphia, March 5—A demonstration run of a rail motor car designer for branch-line railroads and for short runs that do not produce sufficient traffic to warrant a regular train, was made between Philadelphia and Wilmington, on the main line of the Baltimore & Ohio railroad. This company has under consideration the use of some of the cars on its light passenger traffic roads.

The car, which was built by the J. G. Brill Co., Philadelphia, is equipped with motor and chassis supplied by the White Motor Co. The car is of wood and steel and has seating capacity for 35 passengers and standing room for a like number. Officials of the White Co. assert that the car will make nine miles on a gallon of gasoline and that it will develop a speed of 35 miles an hour. It has a carrying capacity of 10,500 lbs. and weighs 16,000.

Railroad officials, including representatives of the Baltimore & Ohio, the Pennsylvania, Delaware & Hudson and

Southern Dealers Increase Business Since Atlanta Show

Florida Sales Are Above Normal and Service Stations Enjoy 20% Increase

ATLANTA, Ga., March 5—Virtually all dealers and distributors in Atlanta report sales unusually good since the Great Southern Automobile Show, with the outlook giving promise of a fairly good spring season. Many of the prospects developed by various dealers at the show have already been turned into sales and the week following the show appears to have witnessed the best week in this regard the industry has experienced in Atlanta for several months, exclusive of show week itself. Furthermore the weather has been unusually mild and the spring buying season has opened up.

In the opinion of D. C. Black, president of the Atlanta Automobile Assn., and a member of the firm of Black & Maffett, Dodge Brothers distributors, dealers in this section are now offering greater values in used cars, considering their prices, than the industry has ever been able to offer in this section. New car prices have been reduced until they are now at rock bottom, and this has necessitated lowering used car prices as well. As a result the used car market has slumped considerably so far as price is concerned, and used cars are in exceptionally good demand.

The best business in the southeast is now being experienced by dealers in Florida, where sales are even above normal, due to the fact that the state is experiencing the biggest tourist season in its history. In other southeastern states distributors in Atlanta report sales volume only fair but gradually beginning to pick up. Business in the smaller communities remains comparatively poor.

Atlanta service stations generally are enjoying about 25 per cent better business than was the case at this time a year ago.

USED CAR EXCHANGE

Bridgeport, Conn., March 8—Establishment and permanent maintenance of a central exchange, or clearing house, in charge of a competent appraiser of motor-vehicle values is the way in which leading automotive dealers of this city and vicinity are going to handle used car sales.

KERN ONLY BOSCH CHANGE

Springfield, Mass., March 5—Arthur T. Murray, president of the American Bosch Magneto Co., declared emphatically today that no further changes in the organization were in prospect as a result of the cabled resignation of Martin E. Kern as a director, which was received last week.

Kern, a former Allentown, Pa., bank-

er and organizer of the Bethlehem Motors Corp., figured prominently in the purchase of the Bosch property from the alien property custodian. This sale is now being investigated by the department of justice.

Murray said he did not know whether or not Kern had disposed of his stock holdings in the company but asserted that they were not large. He added that the affairs of the company were progressing satisfactorily and that a steady increase is being shown in the volume of business.

Veteran Salesman



Following a continuous sales experience of 17 years with the Chicago Mitchell Automobile Co., Curtis M. Betts recently resigned as sales manager of this company, a position he has held since 1913, and has joined the Chicago Packard branch in a sales capacity. Betts' early connection with the Mitchell company was rich in experience with the Royal Tourist and Queen cars. Betts ranks high as a salesman among the best along Chicago's Automobile Row.

WILLS ENCLOSED CARS

Marysville, Mich., March 3—C. H. Wills & Co. are now in production on three new enclosed bodies for the Wills Sainte Claire line, these being an Imperial sedan, a town car and a limousine. The sedan is \$3575 and the town car and limousine \$3850. The sedan has features of both a limousine and a sedan, having a glass partition which can be raised or lowered to divide the car into compartments at will. The limousine and town car have the same dimensions as the sedan except that the distances between seats vary.

Dealer to Test New Service Law In State Supreme Court Suit

Connecticut Statute Limiting Charge to \$50 Without Written Order on Trial

BRIDGEPORT, Conn., March 3—John C. Mattice, a representative local automobile dealer and prominent in activities of Bridgeport Automotive Dealers' Association, has agreed to stand the expense of testing the constitutionality of a recently-enacted section of the state motor vehicle statutes which prohibits repairs costing more than \$50, excepting upon written order of the car owner. Charged with violation of this statute, in the making of repairs to a car owned by William Quigley, Mattice was arraigned in local police court, found guilty and fined \$1 and costs. A pro forma demurrer entered by counsel for Mattice was overruled by Acting City Court Judge Nehemiah Candee of Norwalk.

Assistant Prosecuting Attorney Vincent L. Keating recommended imposing of the fine, with the understanding that an appeal is to be taken to the criminal side of the common pleas court and then carried to the supreme court of the state for a ruling.

Criminal action follows a decision by Judge John R. Booth in common pleas court here this week, in answer to a demurrer filed by counsel for Mattice, to collect a bill of \$130 from John Quigley of this city. Quigley had repairs made to his automobile and, it was claimed, refused to pay cash, and Mattice refused to release the car until the bill was liquidated. Counsel for Quigley demurred on the grounds that Quigley had given no written order for the repairs, as authorized under provisions of the new state law. Judge Booth's ruling, in substance, was to the effect that the statute in question is no barrier to a just collection and decided in favor of Mattice. An attempt was thus made by civil action to get the statute tested, but Judge Booth's ruling was to the effect that a violation is a criminal offense, rather than grounds for civil liability.

DEALERS BACK GEORGIA BONDS

Atlanta, Ga., March 5—At the annual meeting of the Georgia Automobile Assn. held here recently the proposed \$75,000,000 bond issue for the construction of goods roads in the state was endorsed, and the association pledged its support to bringing about the success of the project. W. Tom Winn was re-elected president, and Frank T. Reynolds secretary. William L. Mathers, formerly president of the Georgia Automotive Dealers Assn., was re-elected to the board of directors. A majority of the automobile dealers in Georgia are members of the association.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

HOLDING CAR FOR PAYMENT OF REPAIR BILL

Please advise where we stand in the following: We have a Ford car here with an \$80 repair bill against same and we are holding this car until repair bill is paid. We now find that there is a chattel mortgage or lien note against same and the holder claims that he is going to repossess. Are we in the right here in Saskatchewan, Canada, to hold this car until our claim is paid?

Can we file a mechanic's lien on a car after we let it out of our possession?—Verwood Garage, Saskatchewan, Canada.

The law of Saskatchewan, Canada, does not give the repairman any special lien on personal property for repairs, etc. So your lien would be the common law lien requiring possession for protection. Your statutes do give the repairman the right to sell property upon which he has a lien after three months, if his claim remains unpaid.

You are right in holding the car until your claim is paid to protect you in your lien. Generally your kind of lien has been held to be subject to a prior recorded chattel mortgage. But if the mortgagee forecloses and sale is had you would be entitled to proceeds after the mortgagee's claim has been satisfied.

Perhaps the mortgagee will pay you your claim in order to repossess the car without court action.

No, your laws do not permit your filing a lien on a car, after it has been returned by you to the owner or his agent.

INFORMATION ON ILLINOIS LIEN LAW

Q—Will you please give me some information on the Illinois Lien Law and what steps one must take to secure the benefit of it?

I have several accounts which I have been unable to collect and have been told in one or two instances by those indebted to me that I had no protection under the law.—Howard Stutzman, Congerville, Ill.

1—The "Illinois Lien Law" was enacted for the better protection of any person, firm or corporation depending upon labor, skill or materials or furnishing storage for any chattel, by creating a lien upon such chattel and providing for its enforcement.

2—The same service must be furnished at the request of the owner, reputed owner, or authorized agent of the owner or lawful possessor thereof.

3—The lien begins on the date of the commencement of such expenditure of labor, skill and materials or of such storage for the contract price for all such charges, and is good for one year from and after the completion of such expenditure of labor, materials, etc.

4—Retaining possession is not necessary under this law.

5—But such lien shall cease at the ex-

The Reader's Clearing House

THIS department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of **MOTOR AGE** is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Address of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions, by **MOTOR AGE** organization in conference.

piration of 60 days from the date of delivery of such chattel to the owner or his agent, unless the claimant has within the said 60 days filed in the office of the recorder of deeds of the county where such service has been furnished a lien notice.

6—This lien notice shall state the name of the claimant, the name of the owner or reputed owner, a description of the chattel, sufficient for identification, and the date upon which such expenditure or storage was completed. This notice must be verified by the oath of either the claimant or some one as his agent who has personal knowledge of the facts.

7—The act presents a form for this claim of lien which should be obtained from your county clerk or recorder.

BLUE BODY AND BLACK FENDERS

Q—I would like to paint my car so as to have a blue body and black fenders and wheels. Will you please send me the exact name of the material to purchase for the following coats, primer-filler (not roughstuff), flat-color color varnish and finishing varnish?

Will you please inform me where I can purchase these materials?

I have a permanent file of **MOTOR AGE** since Nov. 24, 1921. In the **MOTOR AGE** of Dec. 15, 1921, you suggest several kinds of material. Will you please inform me which one of the fillers, not including roughstuff, would be best suited for my work? The surface of the car is quite rough.—R. H. Baker, Rock Grove, Ill.

You have named the materials required. Any tool or materials pertaining

to the work can be had from the Chicago College of Auto Painting.

You say that the surface of your car is quite rough but do not state whether this roughness is in the paint coats or the metal panels. If the latter roughstuff would be best, but if you do not care to use it obtain a good grade of sanding surfacer. About three coats of it brushed on and two knifed on will offer a good foundation if the surface is not too rough. However, the number of coats must be gaged by the condition of the surface.

The fenders, wheels and chassis can be all brought up with black air-drying enamel, or this enamel can be used on the chassis, and the fenders and wheels brought up with black color varnish—as you see fit. The body work should be done with the desired shade of blue ground color and blue color varnish.

ADJUSTMENT OF MAIN BEARINGS

Q—A 1920-490 Chevrolet has a pretty loose center main bearing. The front and rear main bearings are in good condition. Is it advisable just to take up the center bearing or tear down the engine and line up the three other bearings. Would it throw crankshaft of line to tighten only one main bearing?

2—How do you take up camshaft bearing on 490 Chevrolet and Buick 6 cars?—Reader, Algoma, Wis.

1—Only in cases of emergency should the center main bearings be tightened without tightening the remaining bearings. If only the lower half of the bearing is worn, that is, the bearing cap, why it would not be necessary to remove the engine. To determine whether the lower or upper half is worn it is necessary to remove the crankshaft and examine the upper half of the center main bearing. If this shows a good bearing surface it is only necessary to replace the crankshaft and adjust the center main bearing by removing shims from the center main bearing cap. If the upper main bearing does not show a good surface it will be necessary to remove the engine and crankshaft and line up the upper halves before any adjustments are made on the lower caps.

2—Chevrolet 490 is not provided with any means for taking up any radial or up and down play in the bearings as the camshaft bearing journals ride directly in the engine case, except the front bearing which is a bronze bushing in the front end of the crankcase just behind the gear, which if replaced will take up the end play which usually causes the noise in these engines. If the holes in the engine block where the camshaft journals ride are worn badly, which should not be the case, it would be cheaper to buy a new camshaft than to have a bushing turned onto the shaft.

As before stated, the bearing provided by the engine block or case wears very slowly and should not require any taking up. The noise coming from the camshaft is most always due to the end play in the camshaft which can be removed by replacing this bronze bushing. The Buick shaft has two bushings, one at either end which can be replaced for the removal of wear. The two center bearings are mounted similar to the bearings in the Chevrolet and cannot be adjusted.

BEARING OPERATIONS ON OLD RAMBLER

Q—Advise how to take a Rambler cross-country crankshaft out of the crankcase.

2—Would its alignment be affected if the bearings are taken out? Is it self aligning?

3—Where can roller bearings that were used in the transmission of that car be purchased?—Rubber City Garage, C. V. Ulrich, Akron, Ohio.

1—The cross-country Rambler crankshaft is removed by unbolting the center and rear main bearing discs from the crankcase. After removing flywheel and transmission in the rear it is possible to remove the crankshaft by pulling it backwards. The center disc is somewhat smaller than the rear disc and will pass through the holes in the rear. In short the Rambler cross-country crankshaft is

removed much in the same way as you would remove a camshaft.

2—The alignment would be effected if the wedges were moved on the discs. The shaft is not self aligning. If the bearings are worn they should not be scraped to any extent but new bushings should be installed which will retain the alignment of the shaft. If considerable material is cut away from the original bushings it will throw the disc out of alignment. This pertains particularly to the lower bearing bushings.

3—These bearings can be secured from the Nash Co. of Kenosha, Wis.

ABOUT WOOD AND WIRE WHEELS

Q—Advise me regarding the different types of wheel used in American cars, artillery, disc and wire, and which are the best.

2—Can wire wheels be fitted to a straight side tire? Are there wire wheels built with demountable rims?

3—What is the difference between the wire wheels Rudge Whitworth and the other wire wheels?

4—Have they begun to use four-wheel brakes in America? What are the ones claimed for the Duesenberg car? Can they be fitted on the four wheels of other cars, for example, the model 61 Cadillac?—Major Taptchileshtoff, "Shipka" 39, Sofia, Bulgaria.

1—American cars are equipped with both artillery, disc and wire type wheels. The majority being equipped with the

conventional wood artillery wheel. However, there is a slight gain in the number of cars using the disc wheel as regular equipment.

2—Wire wheels are fitted to both straight side and clincher tires and also with demountable rims.

3—The difference between the Rudge Whitworth wire wheels and most American wire wheels is the method of fastening and driving the wheel. In the Rudge Whitworth wheel the wheel is driven by a multitude of splines on the hub whereas in wheels of the Houk type the wheel is generally held by studs or dowels, on the hub which enter corresponding holes in the hub of the wheel. The drive is secured by the combination of friction and driving studs.

4—The new Frontenac stock car and the Duesenberg use four wheel hydraulic brakes.

READER WANTS BODY FOR A CROW-ELKHART

Q—Advise where I can secure a set of cuts and blueprints for building a speedster body for Crow-Elkhart car, 1919 model. Or give the names of firms manufacturing bodies for this make of car.—Whiteside Hardware, Whiteside, Mo.

We would suggest that you communicate with the Crow-Elkhart Motor Car Company, of Elkhart, Ind., who no doubt will be in a position to supply you with a speedster body for this car.

IN giving architectural advice MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.

When making request for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

Two Suggested Plans for Battery Service Station

PLAN NO. 395

Q—I am writing to you to get the best idea of a plan for a battery service station. I have copies of Motor Age from Nov. 3, 1921, to the present date.

I want to put up a wooden building with stucco finish on a lot 45x99 ft.

Kindly advise me what kind of a building and how to arrange same for my line of business.—L. E. Totman, Sebastopol, Calif.

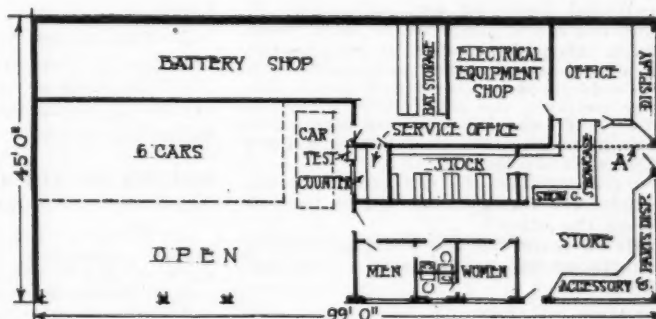
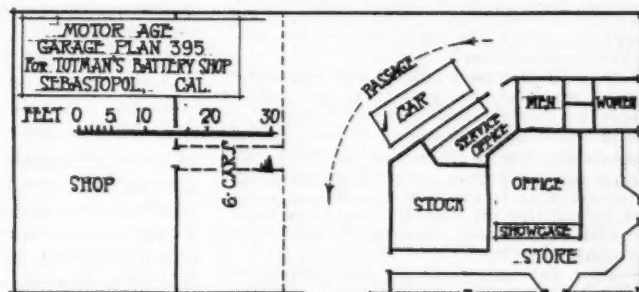
We show two possible layouts for your battery service station and have carried out one a little further than the other as it is really the best layout for California. If it was an Illinois proposition the other might be better though there is very little difference in the capacity of the two stations.

The points which make the lower plan better are the grouping together of shops, office, stockroom, etc., and the generally more handy and efficient layout while the drive-through feature of the other suggestion recommends it.

In your climate the drive-through idea is really not much better than the other in which case the whole side of the garage may be eliminated except for one or two posts to support the wall and roof above.

This location should be a very good one because of its location in a jog in the main street, and for that reason we would recommend going in for accessories. The gas station across the street will help you in this respect as a motorist always likes to make as few stops as possible.

You could start by specializing in electrical accessories like spot lamps of all kinds, head lamps, cigar lighters, lenses, etc., and gradually take on other lines. Electrical goods are especially good for display purposes, the lamps and lighting devices in particular make an attractive appearance night and day.



If more shop and less store space is necessary extend the shop way to the front as indicated by line A and condense the office and store into the remaining space using the space behind the show cases for the office.

WIRING ON SCRIPPS-BOOTH

Q—Publish wiring diagram for 1917 model D-eight cylinder Scripps-Booth — Paul Fehlen, Chicago, Ill.

The diagram of this car is shown at the right.

NO EIGHT CYLINDER REPLACEMENT ENGINE FOR FORD

Q—Could you tell me whether or not there is an eight cylinder engine designed to go in the standard Ford car in place of the regular engine? I have heard that such an engine was being built somewhere in the east. — Dewey Ravenstein, Fort Dodge, Iowa.

We have heard of no such eight cylinder engine for the Ford car.

UNWISE TO DRILL CONNECTING RODS IN MOST CASES

Q—Advise us about how much we could safely reduce the weight of Essex 1920 connecting rods. We would like to reduce the weight by boring holes along the rods. — A. Reader, Evanston, Wyo.

This practice is not recommended, but if you insist on lightening these rods it can be done by drilling holes not larger than 3-16 in. in diameter and not closer together than 1-8 of an inch. These holes should be drilled in that portion of the rod between the two sections of the I-beam. That is they should be drilled in the thinnest part of the rod.

MISCELLANEOUS INFORMATION

Q—Am making some spark intensifiers. What size air gap should be used? That is, what distance should there be between the two connections?

2—How is the best job of lapping done for new pistons? Do you turn the piston or just pull and push it up and down?

3—Is there any chance of a cork faced transmission band lining on a Ford car coming off, or pieces of cork coming off and if so, will it damage anything; such as clogging the oil pipe or anything else, and will it outlast common linings and stop chattering?

4—How far apart should the points be in the breaker of a Connecticut system, aa Delco ignition system?

5—Would there be any advantage of having the spark jump two or more times through intensifiers before it gets to the plug, or is one intensifier sufficient?

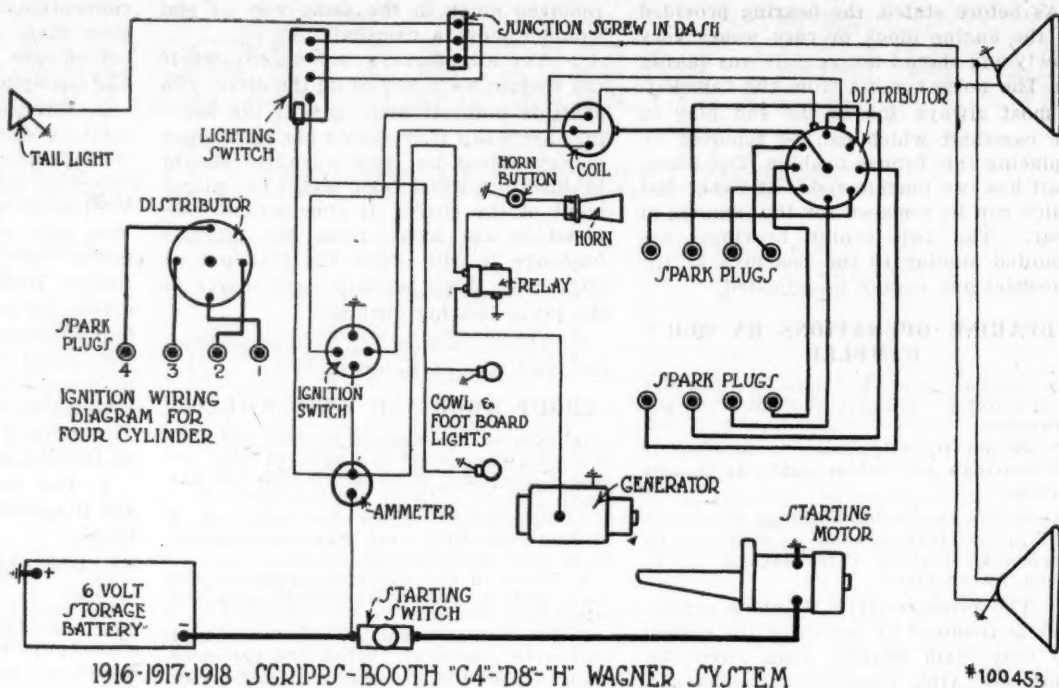
6—Could I connect a battery and a coil to my radiator cap and motor meter so that it would shock the person turning it? Which gives the strongest shock, a Ford coil or a Connecticut coil?

7—Is it hard on the differential to use a larger tire on one rear wheel than is used on the other?

8—Is it easier on the bearings with a counterbalanced crankshaft? — Reader, Victor, Iowa.

1—Approximately .025.

2—In lapping the motion is a combination of spiral and reciprocating. That is, the piston is moved up and down in the cylinder at the same time it is given



a turn of about 1-2 revolution for each stroke. The motion is similar to the motion used in grinding valves.

3—It is possible for some of the cork to break off in the cork faced transmission band lining. It is also possible for this cork to clog the oil pipe. However, we have heard that these cork faced linings have given uniformly satisfactory service in most cases. Cork gives a slightly better and smoother grip on the band which prevents chattering considerably. The type of band wherein the cork is sewed to the fabric should be avoided.

The Ford bands will prevent chattering if they are not glazed. Chattering is caused by the face of the bands becoming glazed and slipping. In fact it causes an intermittent slip and grab with a consequent chatter.

4—.016 to .020 on the Connecticut and .018 on the Delco.

5—No. One air gap is sufficient.

6—This could be done but it would give considerable trouble. The water getting on it would cause leakage of current due to the high voltage used. It would not prevent theft of the radiator cap as the cap could be removed by the use of a dry rag or a pair of gloves or any insulating material placed over the hands.

7—This causes a strain on the thrust bearings of the differential.

8—The bearing pressures are considerably lightened by the proper counterbalancing of any rotating shaft.

STATUS OF ALUMINUM CONNECTING RODS

Q—What are the disadvantages of aluminum connecting rods? Are they much more subject to breakage than steel rods? — S. C. Smith, Springfield, Ohio.

Aluminum alloy connecting rods have not been sufficiently tested to determine whether they are safe to use. The manufacturer of this type rod claim that they will stand as great a load as the con-

ventional connecting rod. Due to the fact that their use has not been widespread we should hesitate to recommend them until they have been given a more thorough test. There is much experimental and development work being done on this type of rod and it is possible that in the near future we may see a successful aluminum alloy connecting rod.

LOCATING TROUBLE IN IGNITION SYSTEM

Q—We are having trouble with a car equipped with Rutenberg motor and Gray & Davis ignition, as it misses at nearly all speeds, and no one seems to know just what is the trouble. Would the installation of magneto do any good? — James T. Peel, Clinton, Ind.

There is no reason why battery ignition will not operate in a satisfactory manner, assuming it is not defective. To determine whether the ignition really is causing the trouble, have all of the spark plug wires loose on the spark plugs and get the engine running at low speed. Then take the spark plug wires off of the plugs, one at a time and hold the terminal near the engine, say with about three-sixteenths inch gap between the terminal and the engine. As the motor idles, the spark should jump this gap every time without missing. If it does so for 50 or 60 times the spark is all right, but if it drops a shot every ten or twelve sparks, it shows trouble in the ignition system, either due to a weak coil, or poor material in the interrupter points, or due to poor condenser connection, or possibly loose connection at some other part of the ignition circuit.

If sparks at all of the plugs test all right and the spark plugs themselves are not cracked or fouled, it would be well to check the timing, and if this is correct and the engine has good compression, it should run in a satisfactory manner.

REMOVAL OF DIRT BY WATER AND AIR SYSTEM

Q—We have been much interested in the articles in your magazine about washing cars with the combined air and water pressure. We do not have water pressure here, but have been considering using a good sized tank for water supply and using air for pressure. How much water pressure should be required, and how large a compressor would be needed to keep up the pressure while washing.

Our needs are not big, and we would probably use it mostly for keeping new cars clean. It is not likely that we would want to wash more than two or three cars a day. We have a 60 gal. tank for inflating tires and thought of connecting this with the water tank and using the air from same tank to connect with the hose line. The compressor is used with this tank in a Brunner No. 102 of 2½ cu. ft. capacity at 300 r. p. m.

For power in the shop we use a 6 h. p. Fairbanks-Morse oil engine. The water tank would be filled by gravity from a nearby water tank, and would not have to be pumped. I thought it would probably be necessary to use a regulating valve between the air tank and water tank as the air tank carries a maximum pressure of 150 pounds which would be much too high for the water pressure.—Geo. M. McKnight, Renick, W. Va.

A minimum of 30 lbs. water pressure will be necessary to secure the best results. With the present compressor we doubt whether you can secure sufficient pressure for any length of time to take care of very many cars. Three cu. ft. of air per minute at 100 lbs. pressure are required to do the job thoroughly. However, by using the small nozzle, 3/16 to ¼ in., you may be able to secure fair results. The regulating valves should be used if you use air pressure to secure pressure on the water.

Fig. 2 shows the method of connecting the air and water lines before mentioned. Great care should be taken when using air and water in order that too high a pressure is not used on the parts that are highly polished or that might be injured from this pressure. If the air and water stream is not to be used for over five minutes at a stretch it will be taken care of by your present equipment, but if continuous usage is made for periods of half an hour or greater your present equipment will be inadequate to supply enough pressure.

INSTALLING 1922 SHUTTERS ON 1917 HUDSON SUPER SIX

Q—Can present type radiator shutters and shells be used on a Hudson 1917 model without any changes except connecting at dash?

2—Is there any adjustment on the differential of a 1917 Super Six and if so, how is it done to take up wear?

3—Give same information on transmission.

4—Would it increase gasoline mileage to run an extra hot air pipe from exhaust pipe at rear of engine to connect with present hot air pipe at bell on carburetor?—R. R. Wallace, Toledo, Ohio.

1—Yes.

2—Before attempting to make any adjustments remove the inspection plug at the left side of gearset and differential carrier. See that the backs of the teeth on both pinion and ring gear are flush. The pinion adjustment can be reached by first removing the pinion adjustment lock held in place by two bolts on the

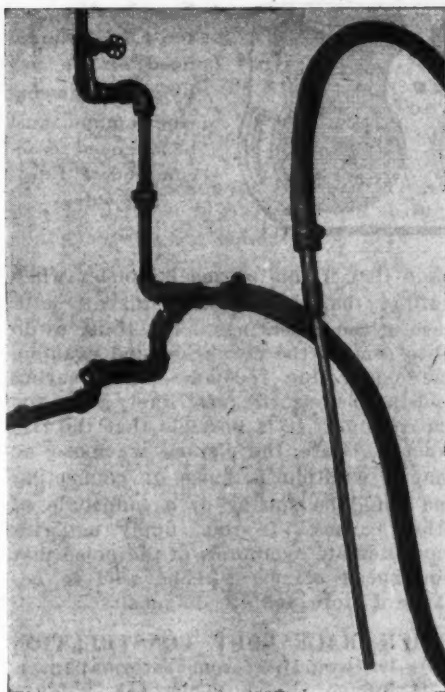


Fig. 2—Connections necessary to secure regulation of air and water jet. The small diameter pipe is the air supply

top of the carrier. End play in the pinion shaft should be taken up by turning the front bearing adjustment toward the left when looking at the axle from the front end.

This is the inner nut. The outer nut which is for the rear bearing adjustment should be held against movement during this operation. Take up the play between the bearings until there is no end motion, but do not bind or cause the shaft to turn hard. Line up the slots in both adjusting nuts, then turn both toward the right to bring the pinion deeper into mesh with the ring gears, or toward the left to withdraw.

The proper amount of backlash between the teeth of the ring gear and pinion is .006 to .008. This adjustment is found on pinion housing which bolts onto the differential or rear axle cover. However if the pinion is flush with the ring gear and there is too much backlash or too little the ring gear may be adjusted either in or out to remedy this condition. The adjustment should be made as follows: Remove the differential cover plate on the rear of the axle housing. Take off the differential bearing adjustment locks and back off slightly the bolts holding the bearing caps in place so that the adjusting nut can be turned easily. Only loosen a very little as the thread in these caps will become cross threaded if the bolts are backed out too much.

To move the gear toward the right back off the right hand adjustment nut one or two notches at a time and take up on the left hand nut the same number of notches, or if the gear needs to go to the left reverse the action. Then take side play out of the bearings by

these adjusting nuts. When the proper results have been obtained tighten the bearing caps and see that the bearing adjustment nut locks are put in place.

3—Adjustments in the Hudson transmission are secured by placing shims behind the Hyatt roller bearings. These adjustments are used only to take up the end thrust. Any radial play can be taken up only by replacement of the bearings.

4—We doubt whether there would be any marked advantage in such an arrangement. A drawing of the rear axle adjustment is being submitted to you by letter.

VALVE TIMING BY DEGREES

Q—We have a Buick model C 36 which will not run right. We cannot get the carburetor adjusted so that it will run good at all speeds. When it is adjusted to run good at slow it misses at high speed, and when adjusted to run at high speed it loads up running slow. The distributor points have been adjusted and fit correctly. The carburetor has been sent to the factory and rebuilt. It has been timed by several mechanics. Could you give any suggestions.—Danville Tire Co., Danville, Ky.

The trouble without a doubt is not due to the carburetor if the carburetor has been rebuilt by the factory, providing that you know how to adjust it properly. Assuming that you know how to adjust the carburetor we will forget the carburetor for the time. The valve timing of this engine should be so that the exhaust valve closes approximately 10 to 13 degs. after upper dead center, which is the equivalent of 1/16 to 3/32 of an inch on the piston travel past the upper dead center mark.

Would advise that you very carefully check over the distributor shaft and if there is any play in excess of .005 in the shaft which carries the distributor cam this will cause the symptoms you speak of. Be sure and check over this very carefully and if there is any wear that cannot be eliminated it would be better to renew the bearings. Also test the spark to see whether it is of sufficient strength. The spark should jump at least ¼ in. from the end of the spark plug wire to the ground at any speed of the engine. If you are in doubt about the correct procedure in adjusting the carburetor kindly notify us. Do not fail to check the valve timing by the marks on the flywheel which are exactly correct.

SERIAL NUMBER ON MONROE

Q—We have a Monroe roadster in our shop to service. It has 30x3 demountable rim wheels and think it is about a 1915 model. Can you give us information as to where we can find engine number on this car and also where we can purchase right, rear axle for same?—Cofer, Kennedy Company, Hodgenville, Ky.

If this is a 1915 model it should be model N2—on the N2 model the car number can be found on a plate on the dash under the hood, and the motor's numbers can also be found on the motor left side near Connecticut coils, stenciled on edge of the gear case. The William Small Co. of Indianapolis, Ind., supplies spare parts for this car.

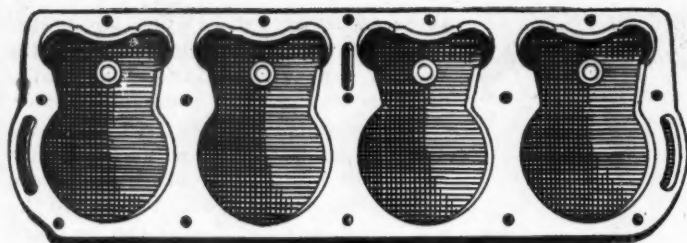


Fig. 3—View of Ford cylinder head of the low type showing where metal must be removed to accommodate Fordson valves.

REMOVING METAL FROM HEAD TO INSTALL LARGER VALVES

Q—Advise from what gasket manufacturer we can get the cylinder head gasket for Fordson valves that are placed in the Ford block.

2—Advise just what portion of the head it is necessary to grind out to clear these valves? I have been informed that the valves have been placed in the engine with merely changing the gaskets and not enlarging the head.—Harbidge Motor Company, Keosauqua, Iowa.

1—The names of firms that supply cylinder head gaskets will be mailed to you.

2—The illustration in Fig. 3 shows an exaggerated view of the way the cylinder head must be cut away to accommodate the larger valves. The valves will strike only the side of the cylinder head. The exact amount of material to be milled off is determined only after the large valves have been installed. A minimum amount should be removed and still give the valves sufficient room. The compression is lowered by removing the metal.

An easy way to determine the exact amount of metal to be removed is to lay the cylinder head on the block. Place two or three screws in the head to position it. Remove all the valves, then with a long scriber mark the position of the various valve centers. This is done by inserting the scriber through the valve stem guide. The mark that you will secure is the center of the valve head. Using this mark as a center lay off a circle for each valve that has the same diameter as the Fordson valve heads.

You will find that a portion of this circle will come to a position outside of the bounds of the regular combustion chamber. Add one-sixteenth to one-eighth of an inch extra at this point to allow for carbon that will accumulate which would interfere with the action of the valves.

LOOSE PARTS CAUSE ENGINE TO KNOCK

Q—Have a model 90 Overland in which the engine has become very noisy. Tell me where the trouble is and what I can do to overcome same.—J. C. Irwin, Cherry Tree, Pa.

This question is exactly the equivalent of asking a doctor what is wrong with you after telling him that you are sick. More definite symptoms of this noise generally comes from some of the parts of the engines being loose. Different parts produce different vibration, and different sounds. By the length of the sound waves and different performance characteristics of the automobile engine the mechanic is enabled to determine what part is loose. We would say off-

hand that if this engine is noisier when pulling than when idling that it is a case of loose bearings. The thing to do is to remove the crankcase and examine the connecting rod and main bearing and the pistons, the most likely place for the trouble. It is possible that the flywheel is loose, the pistons are loose, or that a wristpin is loose or connecting rod could be sprung or a multitude of other causes. If you supply us with more definite symptoms of the noise that you speak of, we will be able to advance a more definite diagnosis.

BUICK RACEABOUT CONSTRUCTION

Q—We would like some information on a racing car Buick model 31. We are building it for half-mile track. The pistons and connecting rods weighed seven pounds. We have lightened them to three. Took 30 pounds off flywheel. Also made firing chamber 1/8 in. smaller. Put in spark plugs in both sides for double ignition. What would be best ignition?

2—Can the valve timing be changed by changing push rods?

3—What degree should these valves be timed? Have put on extra oil pump on this engine.

4—Will a cone clutch be sufficient? This car has 95 in. wheelbase when under-slung and weighs 1400 pounds.

5—What kind of wheels and what size would be best?

6—What would be best rings to use?—Cracraft Garage, Peabody, Kansas.

1—It is quite difficult to state which would be the best ignition. Both the battery and the magneto system are being used successfully on racing cars. You say the engine is equipped for double ignition—we would imagine that you could secure a double spark magneto for less than the price of a double spark battery system.

2—No.

3—The exhaust valve should close approximately 12 degs. after upper dead center.

4—Yes.

5—Wire wheels are usually used for this work. The size is entirely dependent upon the gear ratio, and the engine speed. If the original gear ratio is retained in the rear axle and the engine is speeded up we would recommend that you use not larger than a 30 in. wheel. This will give you the necessary acceleration which is so important on dirt track racing.

6—We know of no best ring to use. Any of the leading makes of rings can be used for this purpose and will give satisfaction if they are properly fitted. If the very highest engine speeds are desired we would recommend the ring producing a very light cylinder wall pressure.

If for slow or medium speeds where the utmost power is desired at medium

speeds the ring could be considerably stiffer. The manufacturers of high grade cars usually use the best ring obtainable, regardless of its price, and if you will observe the make of rings being used in the leading cars you cannot go wrong to adopt any one of those rings for use in your racing car.

ADVANTAGES OF REGRINDING

Q—If the cost is the same, would you advise reboring or putting a new cylinder block on a Scripps-Booth eight cylinder engine?

2—Give reasons.—H. A. Gardner, Capt., Q. M. C., Fort Casey, Washington.

1—There are advantages to both procedures. Generally speaking all things being equal the reboring or regrinding of a cylinder should give slightly better results than the installation of a new block. This is because that the cylinder block has had an opportunity to become thoroughly seasoned and will not have a tendency to distort due to being green. However, not every shop is equipped to do a high grade job of reboring and where the job is not well done and the proper clearances allowed for pistons the job is very inferior and the results obtained are far from satisfactory.

2—If the question of interchangeability of parts which you cannot have if you have a reground job, is not considered the reground block would be the better. The standard block has the advantage that parts may be ordered without having them made as in some cases factories do not furnish oversize pistons or rings. Finally if the job of reboring or regrinding is carefully done by a competent shop the reboring or regrinding should give the best results.

GEAR COVER PLATE FOR CHEVROLET

Q—We are building a Chevrolet model 490 speedster on which we wish to install a magneto. Will you advise if the gear cover plate used on a Model D Samson tractor can be used in place of the Chevrolet gear plate?—G. E. Frost, Abilene, Texas.

The following information was received from the Samson Tractor Co.: We are glad to say that the gear cover plate as used on our model D tractor will fit the Chevrolet engine. However, we must frankly say that a great many more additional parts than the gear cover plate will be required in order to make the complete installation which is desired.

The model D tractor has been out of production for some time but we still have a full supply of parts. The cheaper and better method probably would be to secure the attachments which are put out by the Splittorf Electric Co., the American-Bosch and Eisemann Co. for this car which includes gear case, gears, magneto and everything ready to install.

DAYTON WIRE WHEEL HUB WILL ACCOMMODATE TIMKEN BEARING

Q—Advise if the Timken Roller bearing made for a Ford wheel will fit the Dayton wire wheel hub.—Vista Verrall, Fairfield, Wash.

Yes.

HEINZE SPRINGFIELD DETAILS

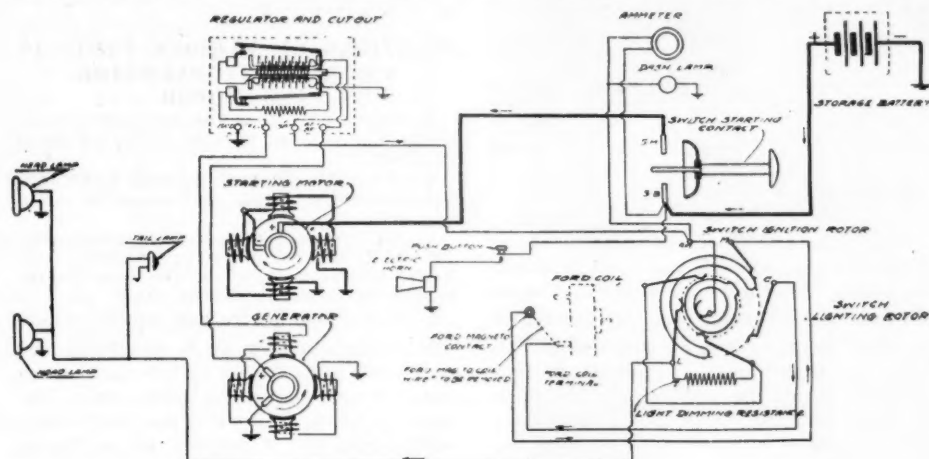
Q—We have a Heinze Starter Generator on a Ford car that has given us quite a lot of trouble. When the ignition switch is turned on the ammeter shows 15 amperes discharge, and when the engine is running it shows 30 amperes charge, as though the generator had no method of regulation.

Can you give wiring diagram of this system and suggestions as to the cause of the trouble?—Frahm's Garage, Manning, Iowa.

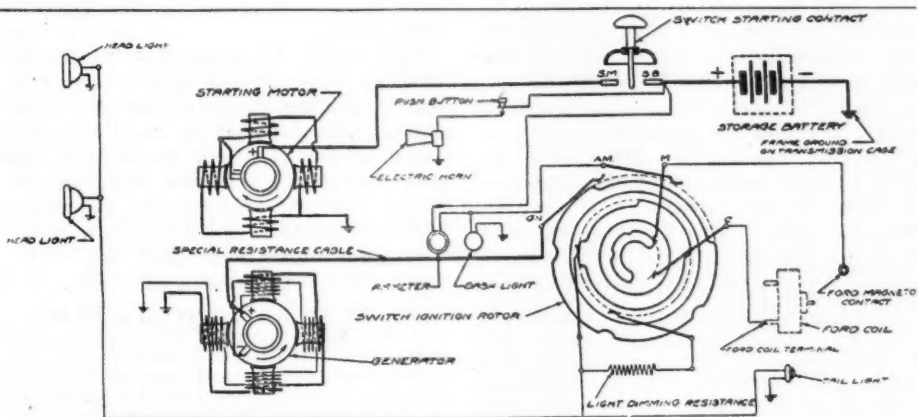
We do not know from your letter whether the system you have is one that had the voltage regulator on the genera-

tor from the time of its installation, it is possible that the series winding is reverse connected, but the ground is the most likely cause of the trouble. To test for ground it will be necessary to lift the negative brush and disconnect the series field ground.

A 110 volt line with lamp in series can then be used to test from the series winding to the frame of the generator and if the lamp lights, it shows that a ground exists. The use of a six volt battery connected from the coil to the frame of the machine will then show by a curl



HEINZE SPRINGFIELD FORD SYSTEM WITH VIBRATING REGULATOR #100465



HEINZE SPRINGFIELD FORD SYSTEM REVERSE SERIES REGULATION #100465

tor or whether the regulation was due to the use of a reverse series field winding, so we are showing both diagrams.

If the car in question has the generator with the reverse series winding, the discharge of 15 amperes is apparently normal in connection with operating the ignition switch, as the generator is connected to the battery at the same time, and this discharge represents the current going through the generator winding before the speed is sufficient to enable it to generate.

Failure to regulate with the reverse series machine might be due to the negative brush being grounded, as from the diagram you will see that this would entirely eliminate the action of the bucking or reverse series winding. If the generator had always charged too much

of smoke the exact location of the trouble.

If the system on your car has the voltage regulator and cutout, then the 15 ampere discharge when the ignition is turned on is abnormal and must be due to incorrect wiring. High charge rate with this system would be due to failure of the regulator as the contacts in it are supposed to open, causing the current to go through the resistance at the base of the regulator on its way back to the shunt field. If the cutout points at the top of the regulator are operating all right it would indicate that the winding is in good condition and that the fault must be in too stiff a spring or in a short which connects the regulator points electrically even while they seem to open mechanically.

Various Methods of Fitting Bearings

Q—Are bearings that are scraped and then run in under belt power as well fitted and as long lived as those that are fitted by burning in?

2—We have heard it argued that burning in robs the metal of its life. Is this true?

3—We understand that most factories use the burning in method. Could bearings be properly burned in without a manufactured machine provided that the machine was so constructed as to hold the engine firmly in position and the power so applied that there was no pull on the crankshaft and the shaft rotated at the proper speed which we understand is approximately 200 r.p.m.?

4—Are bearings fitted with the use of bearing abrasives satisfactory? Is it not true that these abrasives inbed and shorten the life of the bearings? We conduct a service shop for tractors.

5—Which of the above methods of fitting bearings would you recommend?—Knauff & Grone, Mahaska, Kansas.

1—Bearings that are scraped and fitted and then run under belt power are at least as long lived as those that are fitted by burning in.

2—The burning in process is used successfully with some bearing metals but is detrimental to others. It is used primarily as a rapid means of securing a bearing surface on the bearing metal. The burning in machine can be efficiently utilized as a running in machine in cases where it is not advisable to burn in the bearings.

3—Yes.

4—Bearing abrasives if intelligently used are satisfactory. These abrasives should not be used to secure the primary fit. Their function is to act as a finishing abrasive to remove the minute high spots which are present on the surface of the bearing metal. Before the abrasive is applied to the bearing it should have a 40 per cent bearing contact otherwise the results will be disappointing. If properly used there need be no fear of the abrasive shortening the life of the bearing. The abrasive breaks down rapidly after about two minutes of rotation. However, the bearing surfaces should be cleaned and the abrasive removed as much as is possible after the fitting is complete. These compounds are used only to secure the final fit on a bearing which has previously received a preliminary fitting by use of the scraper.

5—Probably the most satisfactory method is the method wherein a line reamer is used to secure the proper alignment. The alignment of the bearings so that the shaft is not stressed to accommodate the individual bearings is the foremost factor in securing frictionless and consequently longer lived bearings. This is the practice followed by the majority of manufacturers. In some cases the bearings are given a final scraping by hand and in the higher grade jobs the bearing surfaces are hand burnished. They are given a period of limbering up on the belt and then the shaft is removed for examination of the condition of the bearing surfaces.

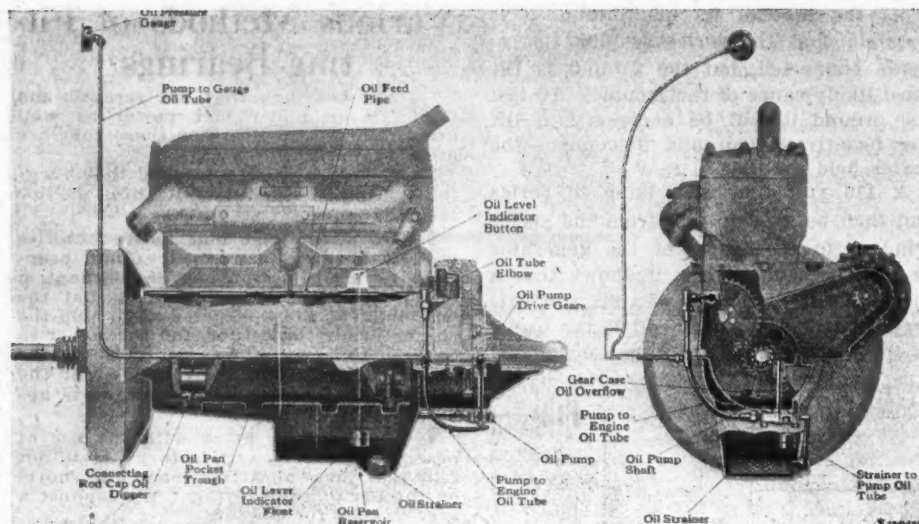


Fig. 4, Dodge oiling system

BOOK ON CAMSHAFT AND IGNITION

Q—We would like to know if there is an automobile book published that will give us camshaft and ignition settings of all different makes of motors. If not, could you give me this information?—Robt. M. Higgins, Indianapolis, Ind.

A—We do not know of any such book but believe you will be safe on any engine if you have the exhaust valve closing when piston is on top dead center or a little past dead center, not to exceed, however, 1/16 in. down from its upper position. The same settings will do for the ignition having the interrupter points opened at above described engine position when the interrupter is in the retard position.

NECESSARY TO THOROUGHLY CLEANSE CYLINDERS AFTER LAPPING OPERATION

Q—Do you consider it good practice to lap cast iron pistons into cast iron cylinders with valve grinding compounds?—The Tolliver Machine Co., Abilene, Kansas.

Valve grinding compound can be used with satisfaction for lapping cast iron pistons into cast iron cylinders. It is necessary though that the cylinders and pistons be very thoroughly washed out with gasoline after the operation. Recently several compounds have been put on the market designed especially for lapping and not for valve grinding. Some of them give very good results also as they possess the feature that they break down very shortly after the parts with which they are covered are rotated.

DATA ON FORD GENERATOR

Q—In the Readers' Clearing House of Dec. 29, 1921, we noted an article by a reader whose Ford generator did not build up or charge unless the commutator was sanded and highly polished and then after an elapse of a few hours would refuse to generate or build up properly. We have the same trouble with a similar Ford generator and remedied the trouble by loosening the four screws on brush end of generator and moving all three brushes from 1/8 to 1/4 in. in direction of rotation, then tightening screws again. This caused generator to charge a little high, but by moving the third brush back in opposite direction to rotation we got our desired charging rate, and the generator never failed to build up immediately.—Herman Schlickeliser, Portland, Ore.

The explanation of the trouble above described and also of the remedy is undoubtedly in the fact that the main brushes had not been properly located in the first place. When a generator of this type is either built or rebuilt battery voltage should be applied to the main terminal and the frame of the generator with the third brush lifted from the commutator so that current will go through the armature only. If the brushes are not correctly located there will be a tendency for the armature to rotate either forward or backward and the rocker ring which holds all of the brushes should then be shifted till there is practically no tendency for the armature to rotate in either direction although it is sometimes considered permissible to have a slight tendency for the armature to rotate in the forward or natural direction. After the main brushes have been set the third brush can then be located so as to give the desired output.

GEAR RATIOS OF POPULAR CARS

Q—Which develops the most power, the Buick Six or the Nash Six and at what engine speed does each reach maximum power?

2—Which has the greatest maximum speed?

3—What is the gear ratio of each on high and second?—Percy Paige, Eau Claire, Wis.

The data given below pertains to the 1920 models of both Nash and Buick cars. The Nash develops approximately 65 h.p. at 2600 r.p.m. The Buick develops approximately 60 h.p. at 2100 r.p.m.

2—This is not known. Most cars will do well over 55 m.p.h.

3—The gear ratio of the Buick K-6-45 is 4.08 to 1. The gear ratio of the Buick K-6-49 is 4.61 to 1. The gear ratio of both Buick models in second is 1.76 to 1. The gear ratio of the axle on the Nash is 4 1/2 to 1. The gear ratio in second is 1.8.

READER WANTS HOT-SPOT FOR ENGINE

Q—Supply name of hot-spot of the replacement type mentioned in your January 12 issue of MOTOR AGE.—Auto Service Co., Kimberly, Idaho.

This will be supplied by letter.

HEINZ MOTOR; DODGE OILING PLAN

Q—Can a Heinz motor and generator from a Ford car be used for charging battery from 110 volt lighting circuit by using a transformer cutting the voltage down from 110 to 6 volts?

2—Publish diagram of Dodge oiling system.—John E. Bidwell, Urbana, O.

1—The Heinz motor and generator will not work for several reasons. One being that the 110 volt current capable of being transformed down to 6 volts is alternating current which will not work on the machine you mention.

2—The plan of oiling on a Dodge car is shown in Fig. 4.

FUNCTIONS OF VARIOUS PARTS IN NORTH EAST GENERATOR AND MOTOR

Q—What part does the series field play when North East system is acting as a generator?

2—What becomes of current generated between third brush and negative main brush?

3—What would keep it from generating current if the ground strap of series field was disconnected?—C. L. Matlock, Hairs-ton Motor Company, Pryor, Okla.

1—When the North East motor generator is functioning as a generator the main field is produced by the shunt field, and it is opposed by the series coils. The opposite holds true when the North East motor-generator functions as a starter or motor.

2—This current flows to the shunt field which is connected directly across from the third brush to the negative main brush.

3—It would be impossible to use the machine as a starter because no current would flow to the armature. If the engine were cranked by hand the generator would blow out the fuse of the generator because of the high current output due to removing the resistance which is offered by the series coils which bucks the shunt field when the motor-generator functions as a generator.

WANTS TO HOT-SPOT OLD BUICK

Q—We have built an old Buick model B-25 into a speedster. Have fitted new valves, light pistons and lowered the compression by raising the blocks with an 1/8 in. fiber sheet. We have cut off about three inches of the inlet manifold upright pipe and fitted a hot air stove. We get remarkable speed out of this job but have trouble with the engine loading up at low speeds. We believe some sort of hot-spot would relieve this. What is your opinion?

2—Will you supply us with the address of some firm making a manifold for this old model, such as the Old Wilmo manifold or if this is impossible will you give us some idea as to how we can hot-spot this manifold? The intake is aluminum and the exhaust above it is of cast iron.—J. N. Green Motor Sales & Service Co., Metropolis, Ill.

1—There is little doubt but what a hot-spot would greatly assist in carburetion on this style engine.

2—This information will be supplied you by letter.

ROCKFORD TRUCK

A letter from Coal Valley, Ill., from which the signature appears to have been unintentionally omitted asks where repairs for a Rockford truck may be obtained. The inquirer might address the Mechanics Machine Co., Rockford, Ill.

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

MANLEY PORTABLE HOIST

The Manley portable hoist is built in two sizes, one of 4000 lbs. and the other of 8000 lbs. It is of bridge type of construction with double braces to legs to prevent spreading, the chains attached always lift vertically because they may be positioned anywhere within the up-rights. It is equipped with automatic lowering brake and the legs fold together to allow storing in small space when not in use.—Manley Mfg. Co., York, Pa.



Manley portable hoist

HB 8-BATTERY CHARGING OUTFIT.

The 8-battery automatic charger is equipped with HB voltage control automatic cutout, ball bearings, in fact all the features of the larger charging outfits.

Its output is 10 amperes and voltage from 6 to 50 volts. The outfit has been priced at \$144. Hobart Bros. Co., Troy, Ohio.

WEAVER SERVICE CAN

This service can is made of heavy galvanized iron strengthened by horizontal ribs. The bottom of the can is specially reinforced to prevent leaks. There is a two-foot flexible steel hose. It is equipped with two handles, permitting ease of handling. Capacity, five gallons.—Weaver Mfg. Co., Springfield, Ill.

IDEAL GREASE CABINET AND PUMP

These cabinets will pump any oil and grease that will sink down in the container and around the pump barrel. The large cover makes it very handy to fill the container, using a scoop or dipper.—Midway Mechanical Co., 155 Selby St., St. Paul, Minn.

CHEVROLET CLUTCH SPRING REMOVER

Hooks over the hub of clutch, screws up to compress spring and it then lets the pin drop out of its own accord. Fits many cars.—Ekern-Turk Manufacturing Co., Pipestone, Minn.



Ideal grease cabinet and pump



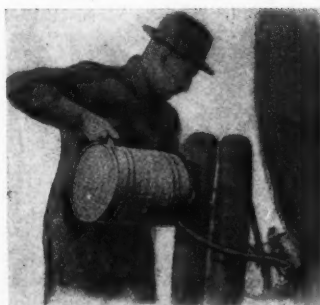
Chevrolet clutch spring remover



Reamer drives



Ideal barrel, grease pump and truck



Weaver service can

BAY STATE NO. 21-1 SET

The wrench can be used either as reversible ratchet or solid wrench, with either "L" or "T" handle with or without extension bar. Included with set is a combination reversible ratchet and solid wrench; one extension bar; one removable adapter for use when wrench is applied direct to socket—either ratchet or solid; a (No. 1) universal joint, and eight sockets of the following sizes: 7/16 in., 1/2 in., 9/16 in., 5/8 in., 11/16 in., 3/4 in., 13/16 in., 7/8 in. The Allen Mfg. Co., Hartford, Conn.

IDEAL BARREL GREASE PUMP AND TRUCK

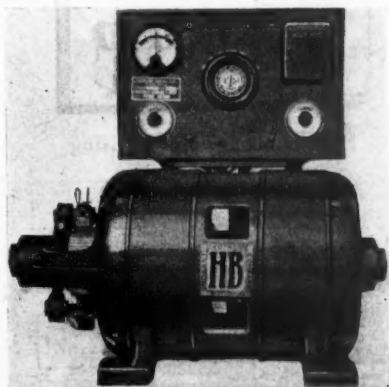
This barrel is equipped with seamless tubing, with double plunger, plunger rod handle cap and clamp. Valve casting with hose nipple of malleable iron, tape threaded for screwing into wood barrels. Large single ball valve. There are five feet of hose with discharge nipple which is put into barrel when not in use. Price, \$5.70. Another and larger barrel is supplied at \$7.90.—Midway Mechanism Co., 1555 Selby St., St. Paul.

BABY GEAR PULLER PRICE

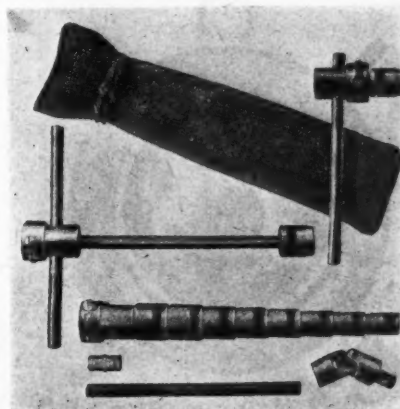
On this page of the Feb. 16th issue of MOTOR AGE the Baby Gear Puller and Generator Bearing Press manufactured by Geo. L. Hunt Co. was mentioned. In that item the price of the Baby Gear Puller should have been \$7.50 and the Generator Bearing Press \$3.50, making a total of \$11.00 for both.

REAMER DRIVES

Geo. H. Blettner Co. reamer drives are operated by a battery placed under the bench upon which the drive is placed. All parts are safeguarded against any possible fall or ill handling. Price \$195 f.o.b. Chicago. Geo. H. Blettner Co., 1841 W. Jackson Blvd., Chicago.



HB 8-Battery charging outfit



Bay State No. 21 set

The ACCESSORY SHOW CASE

New Sources of Retail Profit

THE MEAKER SPARK PLUG

The Meaker spark plug is an altogether new product, in several different ways. One feature of it is the simplicity in cleaning it. The cut illustrates how this is done. This plug eliminates, it is claimed, all leakage of gas from the cylinder head, making for greater power and strength. Retail price \$1. Manufactured by Meaker Spark Plug Co., 532 W. Congress St., Detroit, Mich.

RAD-A-LOK

The Rad-A-Lok Co., 2127 Michigan Ave., Chicago, is making a radiator cap which locks on. The cut describes the functioning. Prices, \$6.00 to \$8.00.

M-C-F TRACTOR ACCESSORIES

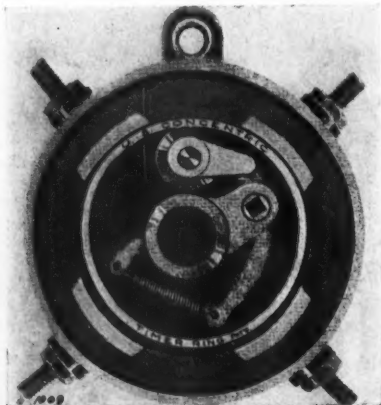
M-C-F tractor accessories consist of a top, platform, fenders and shields. The cut illustrates their usefulness. They all are made of good material and are said to wear well. Michigan Crown Fender Co., Ypsilanti, Mich.

NEW CLEANERS

The Nacto Cleaner Corp. 2171 Madison ave., New York city, recently placed on the market, a variety of cleaners, among them being the Nacto Fabric Cleanser, prepared for removing all stains and spots from cloths of all descriptions; the Nacto Carbon Remover, designed to be used while the motor is hot for the removal of carbon deposit, and the Nacto Tar Remover, which is a solvent for tar and oil. This preparation can be used on rubberized materials.

IMPERIAL SPRING OILER

An oiler for springs and other inaccessible parts of the car. Action of the extended spout sleeve, which has a plunger at its lower end, exerts a pressure on the oil in the can which is forced out through the long flexible spout. The Imperial Brass Mfg. Co., Chicago. Price \$2.



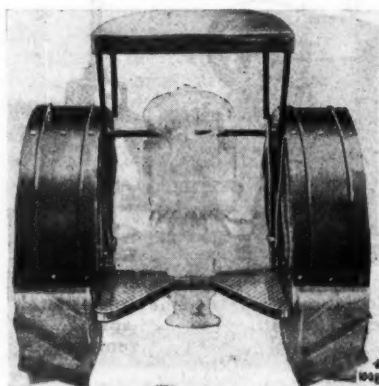
U. S. concentric timer ring



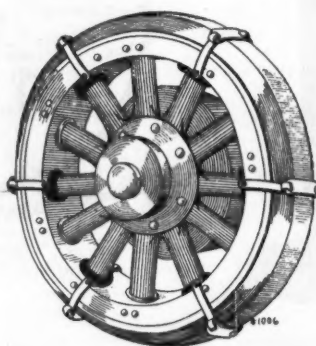
Parts Co. oil gage



Meaker spark plug



M-C-F top, platform, fenders and shields for tractors



Woodworth traction chains



Imperial spring oiler

U. S. CONCENTRIC TIMER RING

The U. S. Concentric Timer Ring is made especially for Ford timers but can be fitted to any standard type of roller timer of Ford style. It is installed in the following manner:

A new roller type timer (Ford preferred) is advised when installing the ring. Place the ring as illustrated then fasten. Oil timer at least once a week with thin oil, one-half lubricating and one-half kerosene. Price, 50 cents, U. S. Auto Equipment Co., Milwaukee, Wis.

PARTS CO. OIL GAGE

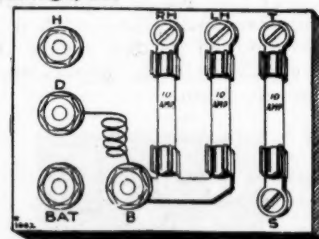
Parts Co. of Indianapolis presents the oil gage pictured here. Numerous features are shown in this gage and complete operation is explained by the cut.

WOODWORTH TRACTION CHAINS

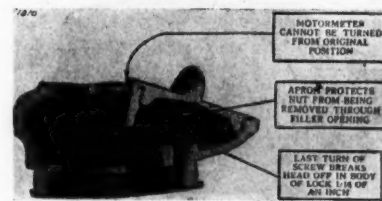
Woodworth traction chains, for solid tires, have the special cross members with the smooth rounded surface next the tire held so that they can rock when the wheel slips, and not dig into the tire. On hard roads they lie flat and so cause no bumping. They are held on the tire by a leather covered chain which wraps around the spoke and is held by a snap which can be snapped into the proper link to give the right adjustment. It can be readily seen that the solid piece of steel will give long wear. Prices depend on size. Woodworth Specialties Co., Binghamton, N. Y.

PROTECTION FOR FORD WIRING

Union Fuse Junction Box for Ford cars is installed on the dash and acts as a safety gate between the power plant and the wiring. When equipped with this device, a short is detected by the blowing of a small fuse in the box thereby catching the dangerous short before damage can be done. Chicago Fuse Mfg. Co., Chicago, Ill.



Protection for Ford wiring



Rad-A-Lok

REELEX

"Reelex"—a new extension reel trouble-light. When used as an independent bracket-portable it can be mounted at any convenient place on the car—under the hood, on the dash, in the tonneau, as a dome light, in the rear compartment of coupes, roadsters, etc. Use a standard bevel contact lamp bulb.

Mounted on the dash Reelex can be connected, by using an attachment plug, to any detachable spotlight, enabling the spot-light to be carried to any part of the car for repairs.

The reel carries 12 feet of extension cord, which is easily and quickly wound up by hand.

Standard finish, black enamel, nickel trim. Complete with switch to control light. List price \$2.50. Grigsby-Grunow-Hinds Co., 906 W. Lake St., Chicago, Ill.

AUTOMATIC TURNING HEADLAMPS

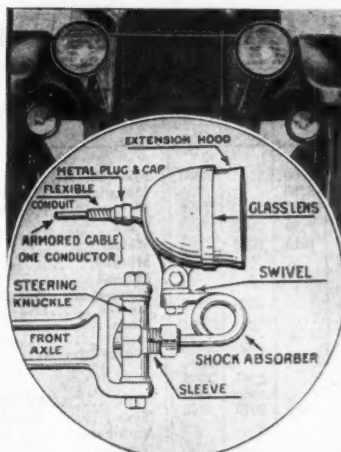
These lamps are attached to the top of the steering knuckle and cast the light rays in the direction in which the wheels are turned. They are attached as follows: the hexagon nut on the threaded end of the steering knuckle arm is removed, the sleeve is fastened on in its place, the coiled shock absorber is attached to the sleeve and the lamp mounted on the shock absorber. The shock absorber provides the necessary resiliency to protect the lamp from harmful vibration. Cincinnati Auto Lamp Co., Cincinnati, O.

SLA PATCH

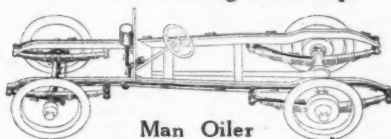
Slapatch is used as a "shoe" to hold blow-outs. Referring to the cut, AA. and BB., canvas flaps, that fit under rim, holding patch securely until patch "sets." AA. holds when applied the long way for small tires. BB. holds when applied the narrow way for large tires. C., double weight canvas back; D., live rubber self-adhering surface which holds patch to inside of casting. An automatic vulcanizing process; E. protective linen covering, to be removed just before applying. Wilson Rubber Co., Des Moines, Ia.

DOOR LOCKING HANDLES

When the driver gets into the car equipped with the door locking device, he relocks the handle before taking key out so that lock is set to catch when he leaves car. Both doors are controlled by one lock.—C. B. Haven Co., Detroit, Mich.



Automatic turning headlamps



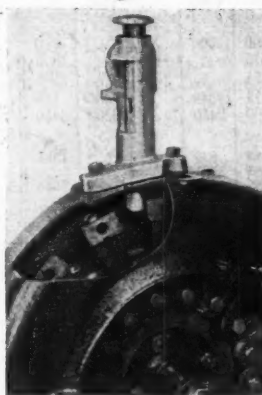
Man Oiler



Door locking handle



Reelex



Wilcox Ford motor locks



Vulcan front spring for Fords

POPULAR TIMER WIRE ASSEMBLY

The illustration shows how the assembly is built up, of a flexible oil-and-water-proof metal hose, encasing the four new code insulated wires, and having the usual spark-coil terminals at one end. At the timer end the cords are enclosed in a fabric, the wires being permanently connected at the factory to eyelet-terminals spaced to fit the timer terminal studs. The fabric is treated and sealed by a special chemical process making it impervious to the action of oil, water or dirt, yet leaving it flexible. Price \$1.50. Grigsby, Grunow, Hinds Co., 906 W. Lake St., Chicago.

CORBIN-BROWN SPEEDOMETER FOR FORDS

This speedometer for Ford cars was recently brought out by the Corbin-Brown Speedometer Co. of New York and is designed for Ford make only. It retails at \$15 and is complete in every detail at that price.

WILCOX FORD MOTOR LOCK

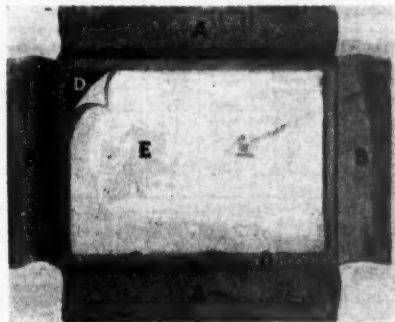
This lock is made to fit any model Ford, is hand operated and is said to control all mechanism as well as being pick-proof, saw-proof and chisel-proof. It is also claimed that no damage will be done by a thief attempting to open or remove the lock. The cut shows the engine when locked. Price \$12.50. Wilcox Motor Devices Co., 1735 Armitage Ave., Chicago.

VULCAN FRONT SPRINGS FOR FORDS

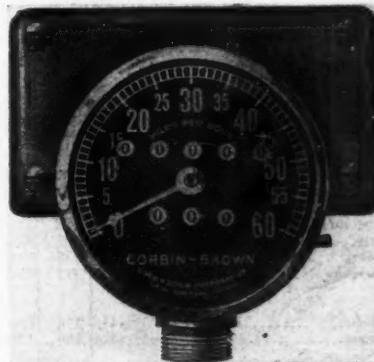
A new 8-leaf front spring for Fords to retail complete for \$3 is the newest addition to the Vulcan line made by the Jenkins Vulcan Spring Co., Richmond, Ind. This spring is known as No. 2010 and is stamped with the Vulcan trade mark. It is interchangeable with the original Ford spring without altering or substituting clips or shackles.

MAN OILER

It is composed of an oil tank under the hood of the car from which the oil is forced through an airtight flexible tubing by means of a plunger pump on the footboard. By pressing foot on the plunger the oil is forced through the tubing to all points of lubrication. Prices range from \$35 to \$60. R. F. Man Mfg. Co., 416 Sherman St., Chicago, Ill.



Slapatch



Corbin Brown speedometer for Fords

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador.....R	Cont.	6-3 1/2 x 5 1/4	136	33 x 5	14500	\$4500	.....	\$6500		Maxwell.....	Ow.	4-3 1/2 x 4 1/2	109	31 x 4	\$ 885	\$ 885	.....	\$1385	\$1485
American.....C	H-S.	6-3 1/2 x 5	127	32 x 4	\$2195	2195	12250	.....	3150	McFarlan.....1921	Ow.	6-4 1/2 x 6	140	33 x 5	6300	\$6300	\$6300	7500	7500
Anderson.....Series 40	Cont.	6-3 1/2 x 4 1/2	120	33 x 4	2195	1650	1795	\$2450	2550	Mercer.....Series 5	Ow.	4-3 1/2 x 6 1/2	132	32 x 4 1/2	3950	\$3950	*3950	4850	5250
Apperson.....8-21-S	Ow.	8-3 1/2 x 5	130	34 x 4 1/2	.....	2620	2645	3625	3695	Merit.....	Cont.	6-3 1/2 x 4 1/2	119	32 x 4	1985	1985	.....	.....	.....
Auburn Beauty Six. 6-51	Cont.	6-3 1/2 x 4 1/2	121	32 x 4	1575	1575	1615	2275	2395	Meteor.....R & RR	Dues.	4-4 1/2 x 6	129	32 x 4 1/2	5500	5500	.....	.....	.....
Auburn.....Beauty Six	Cont.	6-3 1/2 x 4 1/2	121	32 x 4 1/2	.....	12195	.....	.....	.....	Mitchell.....F-50	Ow.	6-3 1/2 x 5	120	33 x 4	11490	1490	1790	2290	2440
Beggs.....20T	Cont.	6-3 1/2 x 4 1/2	120	33 x 4	1775	1520	.....	2320	2420	Mitchell.....F-50	Ow.	6-3 1/2 x 5	127	33 x 4	.....	.....	1795	.....	.....
Bell.....4-32	H-S.	4-3 1/2 x 5	114	31 x 4	1195	1195	.....	.....	.....	Monroe.....1922-S-13	Ow.	4-3 1/2 x 4 1/2	115	32 x 3 1/2	1295	1295	.....	.....	.....
Bell.....6-50	H-S.	6-3 1/2 x 5	124	32 x 4	1545	1545	.....	.....	.....	Monroe.....1922-S-14	Ow.	4-3 1/2 x 4 1/2	115	33 x 4	1785	1785	2285	2785	2785
Biddle.....B1 & B5	Buda.	4-3 1/2 x 5 1/2	121	32 x 4	2950	2950	.....	3950	3950	Moon.....6-48	Cont.	6-3 1/2 x 4 1/2	122	32 x 4	.....	2285	.....	.....	.....
Brewster.....91	Ow.	4-4 x 5 1/2	125	32 x 4 1/2	6000	6000	.....	9200	.....	Moon.....6-68	Cont.	6-3 1/2 x 4 1/2	128	32 x 4 1/2	4250	4250	.....	.....	.....
Buick.....1922-34-35-36-37	Ow.	4-3 1/2 x 4 1/2	109	31 x 4	895	935	.....	1295	1395	Murray-Mac Sis.....	Ow.	6-3 1/2 x 5 1/4	128	34 x 4 1/2	.....	.....	.....	.....	.....
Buick.....1922-44-5-6-7	Ow.	6-3 1/2 x 4 1/2	118	33 x 4 1/2	1365	1395	.....	1885	2165	Nash.....691-96-97	Ow.	6-3 1/2 x 5	121	33 x 4	1360	1390	1540	2060	2390
Buick.....1922-48-9-50	Ow.	6-3 1/2 x 4 1/2	124	34 x 4 1/2	1785	.....	1585	2075	2375	Nash.....692-94-95	Ow.	6-3 1/2 x 5	127	34 x 4 1/2	.....	.....	1540	2060	2390
Cadillac.....61	Ow.	8-3 1/2 x 5 1/2	132	33 x 5	3100	3150	3150	3925	4100	Nash Four.....41-4	Ow.	4-3 1/2 x 5	112	33 x 4	965	985	1485	1645	.....
Case.....X	Cont.	6-3 1/2 x 4 1/2	122	32 x 4 1/2	.....	1890	.....	2790	.....	National.....BB	Ow.	6-3 1/2 x 5 1/4	130	32 x 4 1/2	2750	2750	2750	3890	3990
Case.....V	Cont.	6-3 1/2 x 5 1/4	126	34 x 4 1/2	.....	1935	2585	2990	.....	Noma.....3C	Bea.	6-3 1/2 x 4 1/2	128	32 x 4 1/2	2000	2100	2200	.....	3200
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	117	32 x 4	1245	1295	1395	1995	2295	Noma.....ID	Cont.	6-3 1/2 x 5 1/4	128	32 x 4 1/2	3000	3100	*3200	.....	5500
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	122	32 x 4	.....	1395	.....	.....	.....	Norwalk.....430-KS	Lyc.	4-3 1/2 x 5	116	32 x 3 1/2	.....	1035	.....	.....	.....
Champion.....Tourist	Lyc.	4-3 1/2 x 5	113	32 x 3 1/2	.....	995	1995	.....	.....	Oakland.....6 T De Luxe	Ow.	6-2 1/2 x 4 1/2	115	32 x 4	1120	1145	1265	1685	1785
Champion.....Special	H-S.	4-3 1/2 x 5	118	32 x 4	1095	1095	.....	2295	2395	Ogden.....6 T De Luxe	Cont.	6-3 1/2 x 5 1/4	134	33 x 5	14250	4250	4350	5200	5500
Chandler.....Six	Ow.	6-3 1/2 x 4 1/2	123	33 x 4	1595	1595	1695	2295	2395	Oldsmobile.....43-A	Ow.	4-3 1/2 x 5 1/4	115	32 x 4	1145	1145	.....	1645	1795
Chevrolet.....490	Ow.	4-3 1/2 x 4	102	30 x 3 1/2	525	525	.....	875	875	Oldsmobile.....46	Ow.	8-2 1/2 x 4 1/2	122	33 x 4 1/2	.....	1735	1735	.....	2635
Chevrolet.....FB	Ow.	4-3 1/2 x 5 1/4	110	32 x 4	975	975	.....	1575	1575	Oldsmobile.....47	Ow.	8-2 1/2 x 4 1/2	115	32 x 4	1595	1595	.....	2145	2295
Cleveland.....41	Ow.	6-3 x 4 1/2	112	32 x 4	1175	1195	.....	1550	1575	Overland.....4	Ow.	4-3 1/2 x 4	100	30 x 3 1/2	505	595	.....	850	895
Climber Four.....K	H-S.	4-3 1/2 x 5	115	33 x 4	1385	1385	.....	.....	.....	Packard.....Single-Six	Ow.	6-3 1/2 x 4 1/2	116	33 x 4 1/2	2350	2350	.....	3125	3350
Climber Six.....K	H-S.	6-3 1/2 x 5	125 1/2	33 x 4 1/2	2250	2250	.....	3000	3100	Packard.....Twin Six	Ow.	12-3 x 5	136	35 x 5	3850	3850	3850	5240	5400
Cole.....890	Nort.	8-3 1/2 x 4 1/2	127 1/2	33 x 5	2485	2485	2485	3185	3685	Paige.....6-44	Ow.	6-3 1/2 x 5	119	32 x 4	1465	1465	.....	1995	2245
Columbia Challenger.....	Rut.	6-3 1/2 x 5	115	32 x 4	1195	1195	1995	.....	.....	Paige.....6-66	Cont.	6-3 1/2 x 5	131	33 x 4 1/2	12445	12495	2195	3100	3185
Columbia.....D-C & CS	Cont.	6-3 1/2 x 4 1/2	115	32 x 4	1475	1475	1475	2295	2350	Paterson.....22-6-52	Cont.	6-3 1/2 x 4 1/2	120	32 x 4 1/2	1550	1585	2595	.....	2595
Comet.....C-53	Cont.	6-3 1/2 x 5 1/4	125	33 x 4 1/2	.....	1985	2085	2985	.....	Peerless.....56-S-7	Ow.	8-3 1/2 x 5	126	34 x 4 1/2	2790	2790	3500	3790	.....
Crawford.....22-6-60	Cont.	6-3 1/2 x 5 1/4	122 1/2	32 x 4	3000	3000	3000	.....	4500	Piedmont.....4-30	Lyc.	4-3 1/2 x 5	116	32 x 3 1/2	.....	970	.....	.....	.....
Daniels.....D-19	Ow.	8-3 1/2 x 5 1/4	132	34 x 4 1/2	15350	15350	5350	6250	6950	Piedmont.....6-40	Cont.	6-3 1/2 x 4 1/2	122	32 x 4	.....	1285	.....	.....	.....
Davis.....71	Cont.	6-3 1/2 x 4 1/2	114	31 x 4	.....	1195	.....	.....	.....	Pierce-Arrow.....	Ow.	6-4 x 5 1/2	138	33 x 5	7000	6500	8000	8500	.....
Davis.....61-67	Ow.	120	33 x 4	1595	1595	1695	2095	2195	.....	Pilot.....6-45	Teeter	6-3 1/2 x 5	120	32 x 4	1500	1500	.....	.....	.....
Dixie Flyer.....H-S-70	H-S.	4-3 1/2 x 5	112	32 x 4	1095	1095	1295	1545	1595	Pilot.....6-50	H-S.	6-3 1/2 x 5	126	32 x 4 1/2	2050	2050	2950	3000	.....
Dodge Brothers.....	Ow.	4-3 1/2 x 4 1/2	114	32 x 4	850	880	.....	1280	1440	Porter.....6-40	Ow.	4-4 x 6 1/2	142	35 x 5	6750	6750	7700	.....	7700
Dorris.....6-30	Ow.	6-4 x 5	132	33 x 5	14785	4785	5800	7190	.....	Premier.....6-D	Ow.	6-3 1/2 x 5 1/4	126 1/2	33 x 5	3150	3150	3250	5000	.....
Dort.....19-14	D-Lyc.	4-3 1/2 x 5	108	31 x 4	865	865	.....	1315	1445	Premocor.....6-40 A	Falls.	6-3 1/2 x 4 1/2	117	32 x 4	1095	1095	1195	1750	1825
Driggs.....	Ow.	4-2 1/2 x 4 1/2	104	30 x 3 1/2	1275	1275	.....	1975	.....	R & V Knight.....R	Ow.	4-3 1/2 x 5	116	32 x 4	.....	1850	.....	2650	2750
Duesenberg.....Straight 8	Ow.	8-2 1/2 x 5	134	33 x 5	6500	6500	6750	7800	7800	R & V Knight.....J	Ow.	6-3 1/2 x 5 1/2	127	32 x 4 1/2	2750	2750	2750	3350	3450
Du Pont.....A	Ow.	4-3 1/2 x 5 1/2	124	32 x 4 1/2	3000	3200	.....	3800	4000	Reo Series.....B-T6 & U6	Ow.	6-3 1/2 x 5	120	33 x 4	1595	1595	2355	2435	.....
Durant.....A-22	Anst.	6-3 1/2 x 4 1/2	109	31 x 4	.....	890	.....	1365	1365	ReVerre.....C	Dues.	4-4 1/2 x 6	131	32 x 4 1/2	3200	3200	3200	4000	.....
Durant.....B-22	Anst.	6-3 1/2 x 4 1/2	123	32 x 4 1/2	1600	1650	.....	2250	2400	Rickenbacker.....A	Ow.	6-3 1/2 x 4 1/2	117	32 x 4	1485	1485	1885	1985	.....
Earl.....40	Ow.	4-3 1/2 x 5 1/4	112	32 x 4	1485	1185	.....	1895	.....	Roamer.....6-54-E	Cont.	6-3 1/2 x 5 1/4	128	32 x 4 1/2	2850	2850	2785	3850	3850
Elcar.....K-4	Lyc.	4-3 1/2 x 5	118	33 x 4	1095	1095	1095	1345	.....	Roamer.....4-75-E	Dues.	4-4 1/2 x 6	128	32 x 4 1/2	3985	3585	13750	14650	.....
Elcar.....7-R	Ow.	118	33 x 4	1395	1395	1395	2065	2165	.....	Rolls-Royce.....	Ow.	6-4 1/2 x 4 1/2	143 1/2	33 x 5	U. S. Chms	Price	11750	.....	.....
Elgin.....K-1	Falls.	6-3 1/2 x 4 1/2	118	33 x 4	1345	1295	1345	2195	2195	Romer.....R-22	Cont.	6-3 1/2 x 4 1/2	120	33 x 4	1975	1975	2050	2400	2700
Essex.....	Ow.	4-3 1/2 x 5	109 1/2	32 x 4	1095	1095	.....	1345	1895	Saxon.....125	Ow.	4-3 1/2 x 5	112	32 x 4	1195	1195	.....	1795	1795
Falcon, H.P.M. 12-D22	Ow.	4-2 1/2 x 4	100	27 x 3 1/2	2800	3000	.....	4000	.....	Sayers Six.....DP	Cont.	6-3 1/2 x 4 1/2	118	33 x 4	1685	1695	.....	2795	2795
Ferris.....Series 60	Cont.	6-3 1/2 x 5 1/4	130	32 x 4 1/2	2575	.....	2475	3475	.....	Seneca.....L & O	Lyc.	4-3 1/2 x 4 1/2	108	30 x 3 1/2	945	915	.....	.....	.....
Ferris.....Series 70	Cont.	6-3 1/2 x 5 1/4	130	32 x 4 1/2	2895	.....	2795	3895	.....	Seneca.....50 & 51	Lyc.	4-3 1/2 x 5	112	31 x 4	1095	1095	.....	.....	.....
Ford.....T	Ow.	4-3 1/2 x 4	109	30 x 3 1/2	*319	1348	.....	580	645	Southern Six.....660-2	H-S.	6-3 1/2 x 5	127	32 x 4 1/2	2375	2375	2395	.....	.....
Franklin.....9-B	Ow.	6-3 1/2 x 4	115	32 x 4	2400	2450	.....	3200	3450	Sperling.....A	Supr.	4-3 1/2 x 5	114	32 x 4	980	980	.....	1685	1685
Gardner.....T-R & G	Ow.	4-3 1/2 x 5	112	32 x 3 1/2	895	895	.....	1595	.....	Standard.....J	Ow.	8-3 1/2 x 5	127	34 x 4 1/2	2500	2500	2500	3250	3500
Goodspeed.....	Ow.	6-3 1/2 x 5 1/2	124	32 x 4 1/2	3985	3785	.....	.....	.....	Stanley Steamer.....	Ow.	2-4 x 5	130	34 x 4 1/2	2600	2600	2600	3775	3850
Grant.....	Ow.	6-3 1/2 x 4 1/2	116	32 x 4	1385	1385	.....	1895	1945	Stanwood Six.....	Cont.	6-3 1/2 x 4 1/2	118	33 x 4	1765	1765	.....	2750	.....
H.C.S.....	Weid.	4-3 1/2 x 5 1/2	120	32 x 4 1/2	2725	12775	.....	3450	3650	Stearns.....SKL4	Ow.	4-3 1/2 x 5 1/2	125	34 x 4 1/2	2250	2250	2450	3150	3450
Halladay.....4	Ow.	4-3 1/2 x 5	115	32 x 4	1095	1095	.....	1990	2085	Stephens.....90	Ow.	6-3 1/2 x 4 1/2	122	33 x 4 1/2	1675	1745	1745	2650	2650
Halladay.....6	Ow.	6-3 1/2 x 5	115	32 x 4	1595	1595	.....	2295	2395	Stevens-Duryea.....E	Ow.	6-4 1/2 x 5 1/2	138	35 x 5	7250	6900	6900	18900	.....
Handley-Knight.....	Kn't.	4-4 1/2 x 4 1/2	125	32 x 4 1/2	.....	2650	3450	3450	.....	Studebaker.....Light Six	Ow.	6-3 1/2 x 4 1/2	112	32 x 4	1045	1045	.....	1375	1750
Hanson.....30	Cont.	6-3 1/2 x 4 1/2	112	31 x 4	.....	995	.....	.....	.....							

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason	3 1/2-1	\$1050	3 1/2x5	34x5 1/2	34x5 1/2	W	Commerce, 18	2 1/2	\$2495	4 1/2x5 1/2	36x6 1/2	36x7 1/2	I	Garford, 15	3 1/2	\$1590	3 1/2x5 1/2	34x5 1/2	34x5 1/2	W
Acason, R	1	2260	3 1/2x5 1/2	36x3 1/2	36x5	W	Concord, A	2	3150	4 1/2x5 1/2	36x3 1/2	36x6	W	Garford, 25	1 1/4	1990	3 1/2x5 1/2	36x3 1/2	36x4	W
Acason, RB	1 1/2	1950	3 1/2x5 1/2	36x3 1/2	36x6	W	Concord, B	3	3600	4 1/2x5 1/2	36x4	36x8	W	Garford, 70-H	2	2750	4 1/2x5 1/2	36x4	36x7	W
Acason, H	2 1/2	2750	4 1/2x5 1/2	36x4	36x8	W	Concord, AX	2	3250	4 1/2x5 1/2	36x3 1/2	36x6	W	Garford, 77D	3 1/2	3750	4 1/2x6	36x5	36x6d	W
Acason, L	3 1/2	3450	4 1/2x5 1/2	36x5	36x10	W	Concord, BX	3	3600	4 1/2x5 1/2	36x4	36x8	W	Garford, 68D	5	4500	5 1/2x6 1/2	36x6	40x6d	W
Ac, C	5	4350	5 1/2x6 1/2	36x6	40x12	W	Cook, 51	2 1/2	3600	4 1/2x5 1/2	36x6 1/2	40x8 1/2	I	Garford, 150-A	7 1/2	5200	5 1/2x6 1/2	36x6	40x7d	C
Ac, A	1 1/2	2295	3 1/2x5 1/2	34x3 1/2	34x5	W	Corbitt, E-22	1	1480	3 1/2x5 1/2	34x3 1/2	34x4	W	Gary, F	12-14	2600	3 1/2x5	36x3 1/2	36x4	W
Ac, A	2 1/2	2795	4 1/2x5 1/2	36x4	36x7	W	Corbitt, D-22	1 1/2	2200	3 1/2x5 1/2	34x3 1/2	34x4	W	Gary, I	2	2900	4 1/2x5 1/2	36x3 1/2	36x5	W
Acme, G	3 1/2	...	3 1/2x5 1/2	35x5 1/2	35x5 1/2	W	Corbitt, C-22	2	2600	4 1/2x5 1/2	36x3 1/2	36x6	W	Gary, J	2 1/2	3800	4 1/2x5 1/2	36x4	36x7	W
Acme, B	1	...	3 1/2x5 1/2	34x3 1/2	34x5	W	Corbitt, B-22	2 1/2	3000	4 1/2x5 1/2	36x4	36x7	W	Gary, K	3 1/2	4900	5 1/2x6	36x5	40x5d	W
Acme, F	1 1/2	...	3 1/2x5 1/2	34x3 1/2	34x5	W	Corbitt, R-22	3	3200	4 1/2x5 1/2	36x4	36x8	W	Gary, M	5	5900	5 1/2x6 1/2	36x6	40x6d	W
Acme, A	2 1/2	...	4 1/2x5 1/2	36x4	36x7	W	Corbitt, A-22	3 1/2-4	3800	4 1/2x5 1/2	36x5	36x10	W	Gersix, M	1 1/2	3100	4 1/2x5 1/2	36x3 1/2	36x7	W
Acme, AC	2 1/2	...	4 1/2x5 1/2	36x4	36x7	W	Corbitt, AA-22	5	4500	4 1/2x6	36x6	40x6d	W	Gersix, K	2 1/2	3500	4 1/2x5 1/2	36x4	36x8	W
Acme, C	3 1/2	...	4 1/2x5 1/2	36x5	40x10	W							Gersix	3 1/2	4500	4 1/2x6	36x5	40x12	W	
Acme, E	5	...	4 1/2x6	36x6	40x12	W	Day-Elder, AS	1	1600	3 1/2x5	35x5 1/2	35x5 1/2	W	Golden West, GH	3	4500	4 1/2x6	36x7	36x7	W
Akr'n Multi-Trk20	1 1/2	1695	4 1/2x5 1/2	34x5	34x5	B	Day-Elder, B	1 1/2	2000	3 1/2x5 1/2	34x3 1/2	34x5	W	Golden West, G	3 1/2	5000	4 1/2x5 1/2	36x6	36x6	W
American, 25	2 1/2	3350	4 1/2x5 1/2	36x4	36x4d	W	Day-Elder, D	2	2400	4 1/2x5 1/2	36x4	36x7	W	Graham Bros.	1	1265	3 1/2x4 1/2	33x4 1/2	34x5 1/2	B
American, 40	4	4275	4 1/2x6	36x5	36x5d	W	Day-Elder, C	2 1/2	2750	4 1/2x5 1/2	36x4	36x7	W	Graham Bros.	1 1/2	1325	3 1/2x4 1/2	33x4 1/2	36x6 1/2	B
Apex, G	1	1450	3 1/2x5 1/2	33x5 1/2	33x5 1/2	I	Day-Elder, E	5	4250	4 1/2x6	36x5	40x6d	W	Gramm-Pion. 10	1	1365	3 1/2x5	33x5 1/2	33x5 1/2	F
Apex, D	1 1/2	1915	3 1/2x5 1/2	34x3 1/2	34x4	I	Day-Elder, E	5	4250	4 1/2x6	36x5	40x6d	W	Gramm-Pion. 15	1 1/2	1900	3 1/2x5	36x3 1/2	36x5	I
Apex, E	2 1/2	2995	4 1/2x5 1/2	36x4	36x7	I	Dearborn, E	1 1/2	1600	3 1/2x5 1/2	35x5	35x5	W	Gramm-Pion. 65	1 1/2	2500	3 1/2x5	36x3 1/2	36x5	W
Apex, F	3 1/2	3975	4 1/2x6	36x5	36x10	I	Dearborn, FX	1 1/2	2300	3 1/2x5 1/2	34x4	34x5	W	Gramm-Pion. 20	2	2025	4 1/2x5 1/2	36x4	36x7	W
Armleder, 20	1	...	3 1/2x5 1/2	34x3 1/2	34x5	W	Dearborn, F	1 1/2	2180	3 1/2x5 1/2	34x4	34x5	W	Gramm-Pion. 30	3	3275	4 1/2x5 1/2	36x4	36x4d	W
Armleder, 21	1 1/2	...	3 1/2x5 1/2	34x3 1/2	34x6	W	Dearborn, 48	2	2590	3 1/2x5 1/2	34x4 1/2	34x7	W	Gramm-Pion. 75-P	3 1/2	4225	4 1/2x5 1/2	36x6 1/2	42x9 1/2	W
Armleder, 40	2 1/2	...	4 1/2x5 1/2	36x3 1/2	36x6	W	Defiance, G	1	1695	3 1/2x5 1/2	35x5 1/2	35x5 1/2	B	Gramm-Pion. 40	4	3995	4 1/2x5 1/2	36x5	36x5d	W
Armleder, HW	2 1/2	...	4 1/2x5 1/2	36x4	36x7	W	Defiance, E	2	2275	3 1/2x5 1/2	35x5 1/2	36x7 1/2	I	Gramm-Pion. 50	5-6	4895	4 1/2x6	36x6	40x6d	W
Armleder, KW	3 1/2	...	4 1/2x6	36x5	36x5d	W	DeMartini, 1 1/2	1 1/2	2600	3 1/2x5 1/2	34x3 1/2	34x6	W							
Atco, B	1 1/2	...	3 1/2x5 1/2	34x5 1/2	36x6 1/2	I	DeMartini, 2	2	3300	4 1/2x5 1/2	36x3 1/2	36x7	W	Hahn, J4	1	...	3 1/2x5	34x5	34x5	W
Atco, BI	1 1/2	...	3 1/2x5 1/2	34x5 1/2	36x6 1/2	I	DeMartini, 3	3	4250	4 1/2x5 1/2	36x4	36x10	W	Hahn, CD	1 1/2	...	4 1/2x5 1/2	36x3 1/2	36x6	W
Atco, A	2 1/2	...	4 1/2x5 1/2	36x4	36x8	W	DeMartini, 4	4	4800	4 1/2x6	36x5	36x12	W	Hahn, EE	2 1/2	...	4 1/2x5 1/2	36x4	36x8	W
Atlas, M.D.	1	1185	3 1/2x5	32x4 1/2	32x4 1/2	W	Denby, 31	1 1/2	1485	3 1/2x5 1/2	35x5 1/2	35x5 1/2	B	Hahn, F	3 1/2	...	4 1/2x5 1/2	36x5	36x10	W
Atterbury, 20R	1 1/2	2475	3 1/2x5	34x3 1/2	34x5	W	Denby, 33	1 1/2	2145	3 1/2x5 1/2	35x5 1/2	35x7 1/2	I	Hahn, EF	5	...	4 1/2x6	36x6	40x12	W
Atterbury, 7CX	2 1/2	3175	4 1/2x5 1/2	36x4	36x4d	W	Denby, 34	2	2395	3 1/2x5 1/2	36x3 1/2	36x6	I	Hal-Fur, E	1 1/2	2350	4 1/2x5 1/2	34x5 1/2	34x7 1/2	W
Atterbury, 7D	3 1/2	3975	4 1/2x5 1/2	36x5	40x5d	W	Denby, 35	2 1/2-3	2795	4 1/2x5 1/2	36x4	36x7	I	Hal-Fur, F	2 1/2	3000	4 1/2x5 1/2	36x6 1/2	36x7	W
Atterbury, 8E	5	4975	4 1/2x6	36x5	40x6d	W	Dependable, A	3 1/2-1	1650	3 1/2x5 1/2	34x5	36x6	W	Hall, 1 1/2	1 1/2	3100	3 1/2x5	34x5 1/2	36x7 1/2	W
Autocar, 21UF	1 1/2-2	1950	4 1/2x5 1/2	34x4	34x5	D	Dependable, C	1 1/2	2350	3 1/2x5 1/2	34x3 1/2	34x5	W	Hall, 2 1/2	2 1/2	3275	4 1/2x5 1/2	36x4	36x6	W
Autocar, 21UG	1 1/2-2	2050	4 1/2x5 1/2	34x4	34x5	D	Dependable, D	2 1/2	2650	4 1/2x5 1/2	34x5	36x6	W	Hall, 3 1/2	3 1/2	4100	4 1/2x5 1/2	36x5	36x5d	W
Autocar, 27H	2	2950	4 1/2x5 1/2	34x5	36x7	D	Dependable, E	2 1/2	2950	4 1/2x5 1/2	36x4	36x7	W	Hall, 5	5	5100	4 1/2x5 1/2	36x5	40x6d	W
Autocar, 26Y	5	3950	4 1/2x6	34x6	36x12	D	Dependable, G	3 1/2	3550	4 1/2x6	36x6	36x7	W	Hall, 7 chain	7	5100	4 1/2x5 1/2	36x5	40x6d	C
Autocar, 26-B	5	4100	4 1/2x6	34x6	36x12	D	Diamond T, O-3	1-1 1/2	1975	3 1/2x5 1/2	36x3 1/2	36x4 1/2	W	Harvey, WOA	2	2650	4 1/2x5 1/2	34x4	34x7	W
Available, H1 1/2	1 1/2	2475	4 1/2x5 1/2	36x3 1/2	36x5	W	Diamond T, FS	1 1/2	2525	3 1/2x5 1/2	36x3 1/2	36x5	W	Harvey, WFA	2 1/2	2950	4 1/2x5 1/2	36x4	36x7	W
Available, H2	2	2775	4 1/2x5 1/2	36x3 1/2	36x6	W	Diamond T, T	1 1/2	2250	3 1/2x5 1/2	36x3 1/2	36x5	W	Harvey, WHA	3 1/2	3950	4 1/2x6 1/2	36x5	36x5d	W
Available, H2 1/2	2 1/2	3160	4 1/2x5 1/2	36x4	36x8	W	Diamond T, U	2	2650	4 1/2x5 1/2	36x4	36x7	W	Hawkeye, K	1 1/2	1850	3 1/2x5 1/2	34x3 1/2	34x5	I
Available, H3 1/2	3 1/2	4175	4 1/2x6	36x5	40x5d	W	Diamond T, EL	5	4325	4 1/2x5 1/2	36x5	36x5d	W	Hawkeye, M	2 1/2	2650	4 1/2x5 1/2	36x4	36x6	I
Available, H5	5	5375	4 1/2x6	36x6	40x12	W	Diamond T, S	5	4500	4 1/2x6	36x6	40x6d	W	Hawkeye, N	3 1/2	3700	4 1/2x6 1/2	36x5	36x10	I
Avery	1	...	3 x4	34x5 1/2	34x5 1/2	I	Diehl, A	1	...	3 1/2x5	34x4 1/2	35x5	I	Hendrickson, N	2 1/2	3150	4 1/2x5 1/2	36x4	36x7	W
Beck, A Jr.	1	1950	3 1/2x5	34x3 1/2	34x4	I	Diehl, B	1 1/2	...	3 1/2x5	36x6	36x6	I	Hendrickson, M	3 1/2	3975	4 1/2x5	36x5	36x5d	W
Beck, C	2	2550	3 1/2x5	36x4	36x6	I	Dispatch,													

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
*Kelly-S., K-50	5	.....	4 1/2 x 6 1/2	36x6 40x6d	C	O. K., LI	2 1/2	\$3450	4 1/2 x 5 1/2	36x4 36x8	W	Signal, H	1 1/2	\$2450	4 1/2 x 5 1/2	34x4 36x6	W
*Kelly-S., K-60	6	.....	4 1/2 x 6 1/2	36x6 40x7d	C	O. K., M1	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Signal, J	2 1/2	2875	4 1/2 x 5 1/2	34x4 36x8	W
Keystone, 40	2	\$2175	4 1/2 x 5 1/2	34x5 38x7 1/2	W	Ogden, D	1 1/2	.....	3 3/4 x 5	36x3 1/2 36x5	W	Signal, M	3 1/2	3675	4 1/2 x 5 1/2	36x5 40x5d	W
Kimball, AB	2	3675	4 x 6	36x4 36x7	W	Ogden, E	2 1/2	.....	3 3/4 x 5 1/2	36x4 36x8	W	Signal, R	5	4400	4 1/2 x 6	36x6 40x6d	W
Kimball, AK	2 1/2	3975	4 1/2 x 6	36x4 36x8	W	Old Hickory, W	1	1775	3 3/4 x 5	36x3 1/2 36x4	W	Southern, 10	1 1/2	2090	3 3/4 x 5	34x3 1/2 34x4	W
Kimball, AE	3	4500	4 1/2 x 6	36x4 36x10	W	Old Reliable, A	1 1/2	2350	4 x 5	34x4 36x6	W	Southern, 15	1 1/2	2590	3 3/4 x 5 1/2	36x6 38x6	W
Kimball, AF	4	5000	4 1/2 x 6	36x6 40x12	W	Old Reliable, B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	Standard, 1-K	1 1/2	1600	4 1/2 x 5 1/2	36x6 40x8	W
Kissel, Express	1	1995	3 3/4 x 5 1/2	34x5 34x5 1/2	W	Old Reliable, C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Standard, 76	2 1/2	2400	4 1/2 x 5 1/2	36x4 36x7	W
Kissel, Utility	1 1/2	1975	3 3/4 x 5 1/2	36x3 1/2 36x5	W	Old Reliable, D	5	5250	4 1/2 x 6	36x6 40x6d	W	Standard, 66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x10	W
Kissel, Freight	2 1/2	2575	4 1/2 x 5 1/2	36x4 36x7	W	Old Reliable, KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7d	C	Standard, 5-K	5-7	4400	4 1/2 x 6	36x6 40x12	W
Kissel, H. D.	4	3675	4 1/2 x 5 1/2	36x5 36x5d	W	Olympic, A	2 1/2	1095	3 3/4 x 5 1/2	35x5 1/2 35x5 1/2	I	Sterling, 1 1/2	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5	W
Kleiber, AA	1	2600	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Olympic, A	2 1/2	3200	3 3/4 x 5 1/2	36x4 36x8	W	Sterling, 2 1/2	2	3085	4 x 5 1/2	36x4 36x6	W
Kleiber, BB	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2 36x6	W	Oshkosh, AA	2	3750	3 3/4 x 5	36x6 36x6 1/2	4	Sterling, 3 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4 36x4d	W
Kleiber, BB	2	3600	4 1/2 x 5 1/2	36x4 36x7	W	Oshkosh, AA	2 1/2	3850	3 3/4 x 5	36x6 36x6 1/2	4	Sterling, 5-W	5	4950	5 x 6 1/2	36x5 40x5d	W
Kleiber, BB	2 1/2	3950	4 1/2 x 5 1/2	36x5 36x8	W	Oshkosh, BB	2 1/2	4300	4 x 5 1/2	36x7 36x7 1/2	4	Sterling, 5-C	5	5500	5 x 6 1/2	36x6 40x6d	W
Kleiber, C	3 1/2	4600	4 1/2 x 5 1/2	36x6 36x5d	W	Packard, EC	1 1/2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	Sterling, 7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x7d	C
Kleiber, D	5	5300	5 x 6 1/2	36x6 40x12	W	Packard, EX	1 1/2-3	3100	4 1/2 x 5 1/2	36x6 40x8 1/2	W	Stewart, 14	1 1/2	1195	3 3/4 x 5 1/2	32x4 1/2 32x4 1/2	I
Koehler, M	1 1/2	1995	3 3/4 x 5 1/2	34x3 1/2 34x5	W	Packard, ED	2-4 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 15	1	1395	3 3/4 x 5 1/2	35x5 1/2 35x5 1/2	I
Koehler, D	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	Packard, EF	4-7 1/2	4500	5 x 5 1/2	36x6 40x6d	W	Stewart, 9	1 1/2	1790	3 3/4 x 5	34x3 1/2 34x5	I
Koehler, MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Paige, 52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	Stewart, 7	2	2090	4 1/2 x 5 1/2	34x4 34x7	I
Koehler, F	3 1/2	4150	4 1/2 x 5 1/2	36x5 36x10	W	Paige, 54-20	2 1/2	2420	4 1/2 x 5 1/2	34x4 34x8	W	Stewart, 7-X	2 1/2	2290	4 1/2 x 5 1/2	34x4 34x7	I
Koehler, MT, Trac	5	3275	4 x 5 1/2	36x4 36x7	W	Paige, 51-18	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 10	3 1/2	3090	4 1/2 x 5 1/2	36x5 36x5d	I
Lange, B	2 1/2	3350	4 1/2 x 5 1/2	36x4 36x7	W	Parker, F20	2	3500	4 x 6	34x4 36x4d	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 6	36x5 36x5d	I
Larabee, X-Z	1	1925	3 3/4 x 5 1/2	34x5 34x5 1/2	B	Parker, J20	3 1/2	4400	4 1/2 x 6	36x5 40x5d	W	Stoughton, C	1	1240	3 3/4 x 5 1/2	34x4 1/2 34x4 1/2	I
Larabee, U	1 1/2	2100	3 3/4 x 5 1/2	34x3 1/2 34x5	W	Parker, M20	5	5500	4 1/2 x 6	36x6 40x6d	W	Stoughton, A	1 1/2	1995	3 3/4 x 5 1/2	34x4 1/2 35x5 1/2	W
Larabee, K	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W	Patriot, Reverse	1	1500	3 3/4 x 5	35x5 1/2 35x5 1/2	W	Stoughton, B	1 1/2	2350	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Larabee, L-4	3	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Patriot, Lincoln	2	2050	4 x 5 1/2	34x3 1/2 34x5	W	Stoughton, D	2	2800	4 x 5 1/2	36x4 36x7	W
Larabee, W	5	4800	4 1/2 x 6	36x6 40x6d	W	Piedmont, 4-30	1	1200	3 3/4 x 5	34x4 34x4 1/2	W	Stoughton, F	3	3600	4 1/2 x 5 1/2	36x5d 36x5d	W
Luedinghaus, C	1 1/2	1695	3 3/4 x 5 1/2	35x5 1/2 35x5 1/2	W	Pierce-Arrow	2	3200	4 x 5 1/2	36x4 36x4d	W	Sullivan, E	3 1/2	2700	4 1/2 x 6	36x5 36x5d	W
Luedinghaus, W	1 1/2	2400	3 3/4 x 5 1/2	34x3 1/2 34x5	W	Pierce-Arrow	3 1/2	4350	4 1/2 x 6 1/2	36x5 36x5d	W	Superior, D	1	1650	3 3/4 x 5	34x4 1/2 34x4	I
Luedinghaus, K	2-2 1/2	3150	4 1/2 x 5 1/2	36x4 36x7	W	Pierce-Arrow	5	4850	4 1/2 x 6 1/2	36x5 40x6d	W	Superior, E	2	2600	4 1/2 x 6 1/2	36x4 36x6	I
Maccar, L	1 1/2	2700	4 1/2 x 5 1/2	36x4 36x6	W	Pioneer, 59	1	1550	3 3/4 x 5 1/2	32x4 1/2 32x4 1/2	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4 36x8	W
Maccar, H-A	2	3100	4 1/2 x 5 1/2	36x4 36x4d	W	Pittsburgher	1 1/2-2	3000	3 3/4 x 5 1/2	36x5 36x6	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5 40x5d	W
Maccar, H-2	3	3400	4 1/2 x 5 1/2	36x4 36x5d	W	Pittsburgher	3	3800	4 1/2 x 5 1/2	36x5 36x8	W	Super Truck, 100	5	5300	4 1/2 x 6	36x5 40x12	W
Maccar, H-3	4	4200	4 1/2 x 5 1/2	36x5 36x6d	W	Power, C	2	3150	4 1/2 x 5 1/2	36x5 36x7	W	Super Truck, 150	7 1/2	6300	5 x 6	36x6 40x7d	W
Maccar, G	5-6	4950	4 1/2 x 6	36x6 40x6d	W	Premcor, B-143	3 1/2	4250	4 1/2 x 5 1/2	36x5 40x10	W	Texas, A38	3 1/2	1095	3 3/4 x 5	33x4 33x4	I
MacDonald, A	7 1/2	5750	5 x 6 1/2	40x7 40x14	I	Rainier, R-21	1 1/2	2475	3 3/4 x 5	36x6 36x6 1/2	W	Texas, TK39	1 1/2	1550	3 3/4 x 5	36x6 36x7	W
Mack, AB, D.R.	1 1/2	3150	4 x 5	36x4 36x3 1/2d	D	Rainier, R-19	1	1990	3 3/4 x 5	35x5 1/2 35x5 1/2	W	Tiffin, GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack, AB Chain	2	3300	4 x 5	36x4 36x4d	D	Rainier, R-16	1 1/2	2150	3 3/4 x 5	34x3 1/2 34x4	W	Tiffin, MW	2 1/2	2700	4 1/2 x 5 1/2	36x3 1/2 36x5d	W
Mack, AB, D.R.	2	3750	4 x 5	36x4 36x4d	D	Rainier, R-15	2	2490	3 3/4 x 5	34x3 1/2 34x5	W	Tiffin, PW	3 1/2	3600	4 1/2 x 5 1/2	36x5 40x5d	W
Mack, ABDR	2 1/2	3850	4 x 5	36x4 36x4d	D	Rainier, R-20	2 1/2	2890	3 3/4 x 5 1/2	34x4 34x6	W	Tiffin, F50	5	4300	4 1/2 x 6	36x6 40x6d	W
Mack, AB	2 1/2	3400	4 x 5	36x4 36x4d	C	Rainier, R-15	3 1/2	3550	4 1/2 x 5 1/2	34x4 34x7	W	Tiffin, F60	6	4500	4 1/2 x 6	36x6 40x12	W
Mack, AC Chain	3 1/2	4050	5 x 6	36x5 40x5d	C	Rainier, R-17	5	4400	4 1/2 x 5 1/2	36x5 36x5d	W	Titan	2	2650	4 1/2 x 6	36x4 36x7	I
Mack, AC Chain	5	5500	5 x 6	36x6 40x6d	C	Ranger, TK-22-2	2	5100	4 1/2 x 6	36x6 36x6d	W	Titan	3 1/2	3950	4 1/2 x 6	36x5 40x10	I
Mack, AC Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Reliance, 10A	3 1/2-11	2775	3 3/4 x 5	36x6 36x7 1/2	W	Titan	6	4550	4 1/2 x 6	36x5 40x10	I
Mack, AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Reliance, 20B	1 1/2	1245	4 1/2 x 5 1/2	34x4 1/2 34x4 1/2	B	Tower, J	1 1/2	5150	4 1/2 x 6	36x5 40x12	I
Mack, AC Chain	5	3400	4 x 5	36x4 36x4d	C	Republic, 75	2 1/2	2400	4 x 5 1/2	36x4 36x4d	I	Tower, H	2 1/2	2900	4 1/2 x 5 1/2	35x5 38x7	W
Mack Trac, AB	7	4950	5 x 6	36x5 40x5d	C	Republic, 10	1	1395	3 3/4 x 5	36x4 36x4d	I	Tower, G	3 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W
Mack Trac, AC	10	5500	5 x 6	36x6 40x6d	C	Republic, 10Exp.	1	1695	3 3/4 x 5	34x3 34x4	I	Traffic, C	.....	1595	3 3/4 x 5	34x3 1/2 34x5	I
Mack Trac, AC	13	5750	5 x 6	36x6 40x12	C	Republic, 11X	1 1/2	1795	3 3/4 x 5	34x3 1/2 34x6	I	Traffic	3	1895	3 3/4 x 5	34x3 1/2 36x7	I
Mack Trac, AC	15	6000	5 x 6	36x7 40x7d	C	Republic, 19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	Transport, 20	1 1/2	1395	3 3/4 x 5	34x3 1/2 34x4	I
Mapleleaf, AA**	2	3775	4 x 5 1/2	36x4 36x7	W	Republic, 20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	W	Transport, 30	1 1/2	1995	3 3/4 x 5	36x3 1/2 36x5	I
Mapleleaf, BB**	3	4350	4 1/2 x 5 1/2	36x4 36x4d	W	Rowe, CW	1 1/2	3000	3 3/4 x 5	36x6 36x6 1/2	W	Transport, 50	2 1/2	2785	4 1/2 x 5 1/2	36x4 36x7	I
Mapleleaf, CC**	4	5100	4 1/2 x 5 1/2	36x5 36x5d	W	Rowe, C. D. W.	2	3300	4 x 5	34x4 36x3 1/2d	W	Traylor, B	1 1/2	2390	3 3/4 x 5 1/2	34x3 1/2 34x5	W
Mapleleaf, DD**	5	6200	4 1/2 x 6	36x6 40x6d	W	Rowe, G. S. W.	3	4150	4 x 6	34x5 36x5d	W	Traylor, C	2	2850	4 x 5 1/2	36x4 36x7	W
Master, JW	1 1/2	2200	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Rowe, G. P. W.	3	5250	3 3/4 x 5 1/2	38x7 42x9 1/2	W	Traylor, D	3	2300	4 1/2 x 5 1/2	36x4 36x8	W
Master, JD	1 1/2	2590	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Rowe, F. W.	4	4500	4 1/2 x 6	36x6 36x6d	W	Traylor, E	4	4450	4 1/2 x 6	35x5 40x10	W
Master, Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Ruggles, 20	1	5500	4 1/2 x 6	36x6 40x6d	W	Traylor, F	5	4700	4 1/2 x 6	36x6 40x6d	W
Master, W	2 1/2	2890	4 1/2 x 5 1/2	34x4 36x7	W	Ruggles, 40	2	1195	3 3/4 x 5	34x5 1/2 34x5 1/2	B	Triangle, AA	3 1/2-1	1385	3 3/4 x 5 1/2	34x4 1/2 34x4 1/2	I
Master, DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Sandow, G	1	2295	3 3/4 x 5	34x3 1/2 34x5	W	Triangle, A	1 1/2	2350	3 3/4 x 5 1/2	34x3 1/2 34x6	I
Master, A	3 1/2	3990	4 1/2 x 6	36x5 40x5d	D	Sandow, CG	1 1/2	2590	3 3/4 x 5	34x4 34x6	W	Triangle, B	2 1/2	2950	4 x 5 1/2	36x4 36x7	I
Master, E	3 1/2	4290	4 1/2 x 6	36x5 40x													

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Walter, S	5	\$4850	4 1/2 x 6 1/2	36x6	40x6d	W	Wichita, RX	3	\$3500	4 1/2 x 5 3/4	36x4*	36x8*	W	Winther, 430	1 1/2	\$2850	3 1/2 x 5	32x4	32x4	I
Ward-LaF., 2B	2 1/2	2990	4 1/2 x 5 1/2	36x4	36x4d	W	Wichita, O	4	3900	4 1/2 x 6 1/2	36x5*	36x5d*	W	Winther, 39	1 1/2	2450	3 1/2 x 5	34x3 1/2	34x5	I
Ward-LaF., 4A	3 1/2	3990	4 1/2 x 6 1/2	36x5	36x5d	W	Wilcox, AA	1	1900	3 1/2 x 5 1/2	36x4*	36x4*	W	Winther, 49	2	3250	4 x 5	34x4	34x4d	I
Ward-LaF., 5A	5	4590	5 x 6 1/2	36x6	40x6d	W	Wilcox, BB	1 1/2	2550	4 1/2 x 5	36x4	36x5	W	Winther, 50	2 1/2	3995	4 x 6	33x7 1/2	42x9 1/2	I
Watson, B	1	1685	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Wilcox, D	2 1/2	3000	4 1/2 x 5	36x4*	36x3 1/2d*	W	Winther, 70	3 1/2	4200	4 x 6	36x5	36x5d	I
Watson, N	3 1/2	3825	4 1/2 x 5 1/2	36x5	36x10	W	Wilcox, E	3 1/2	3950	4 1/2 x 6	36x5*	36x5d*	W	Winther, 450	2 1/2	3690	4 x 5	34x5	36x6	I
Western, W1 1/2	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2	36x5*	W	Wilcox, F	5	4350	4 1/2 x 6 1/2	36x5	40x6d	W	Winther, 109	5	5250	4 1/2 x 6	36x6	40x5d	I
Western, L1 1/2	1 1/2	2550	3 1/2 x 5	36x3 1/2*	36x5*	W	Wilson, F	1 1/2	2270	3 1/2 x 5	36x3 1/2	36x5	W	Winther, 140	7	5900	5 x 6	36x6	40x7d	I
Western, W2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W	Wilson, EA	2 1/2	2825	4 1/2 x 5 1/2	36x4	36x7	W	Wisconsin, B	1	1750	3 1/2 x 5	34x5 1/2	34x5 1/2	W
Western, L2 1/2	2 1/2	3250	4 1/2 x 6	36x4	36x7	W	Wilson, G	3 1/2	3685	4 1/2 x 5 1/2	36x5	36x5	W	Wisconsin, C	1 1/2	2500	4 x 5 1/2	36x6	36x6	W
Western, W3 1/2	3 1/2	4250	4 1/2 x 6	36x5	40x5d	W	Wilson, H	5	4520	4 1/2 x 6	36x6	40x6	W	Wisconsin, F	2	3000	4 1/2 x 5 1/2	36x7	40x8	W
White, 15	1 1/2	2400	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	B	Winther, 751	1	1795	3 1/2 x 5	34x4 1/2†	35x5	I	Wisconsin, D	2 1/2	3500	4 1/2 x 6 1/2	36x6	36x10	W
White, 20	2	3250	4 1/2 x 5 1/2	36x4	36x7	D							Wisconsin, C	3 1/2	4000	5 x 6 1/2	36x6	36x12	W	
White, 40	3 1/2	4200	4 1/2 x 5 1/2	36x5	40x5d	D							Witt-Will, N	1 1/2	2250	3 1/2 x 5	36x3 1/2*	36x5*	W	
White, 45	5	4500	4 1/2 x 5 1/2	36x6	40x6d	D							Witt-Will, P	2 1/2	2750	4 1/2 x 5 1/2	36x3 1/2*	36x7*	W	
White-Hick, E	1	1225	3 1/2 x 5	34x5 1/2	34x5 1/2	W							Wolverine, J	1	2125	3 1/2 x 5	34x3	34x4	I	
White-Hick, H	1 1/2	1375	3 1/2 x 5	36x3 1/2	36x5	W							Wolverine, J	1 1/2	2375	3 1/2 x 5	34x3 1/2	34x5	I	
White-Hick, K	2 1/2	1675	4 1/2 x 5 1/2	36x4	36x5	W							Wolverine, J	2	2640	3 1/2 x 5	34x4	34x7	I	
Wichita, K	1	2000	3 1/2 x 5 1/2	36x3*	36x4*	W							Wolverine, J	2 1/2	3425	4 1/2 x 5 1/2	36x5	36x10	I	
Wichita, M	2	2500	3 1/2 x 5 1/2	36x3 1/2*	36x6*	W							Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	I	

*2-cyl. †6-cyl. ‡3-cyl. All others, not marked, are 4-cyl.
Trac. Tractor. *Canadian made.
F—Front Drive; W—Worm; I—Internal Gear, C—Chains, D—
Double Reduction, B—Bevel, 4—Four-Wheel, E—External
Gear. *Tires—optional. †Pneumatic Tires. All others solid.
††Price includes body. \$—Price includes several items of
equipment.

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl.
Trac., Tractor. **Canadian made.
Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. Tires—optional. †Pneumatic Tires. All others solid.
†Price includes body. \$—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity
All-In One...	15-30	\$1975	3	Weid.	4-4 x 5 1/2	GDK	2-3	Grain Belt...A	18-36	\$2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Pioneer.....C	40-75	.....	4	Own	4-7 x 8	Gas.	10
Allis-Chalm. B	6-12	925	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Gray.....1920	18-36	2000	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Playman.....	15-30	\$1695	4	Buda	4-4 1/2 x 6	G, K	3-4
Allis-Chalm. G.P.	14-27	795	2	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Ground Hog...	19-31	2000	4	Erd.	4-4 x 6	G or K	3	Port Huron...	12-25	1500	4	Chief	4-3 1/2 x 6	G, K	3
Allis-Chalm. ...	18-30	2150	4	Own	4-4 1/2 x 5 1/2	GorK	3-4	Gt. Western St.	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Ranger Cal.	8-16	.....	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1
Allis-Chalm. ...	22-38	875	4	Own	4-4 1/2 x 6 1/2	G, K	4	Hart-Parr...20	20	945	4	Own	2-5 1/2 x 6 1/2	K, D.	2	Reliable.....	10-20	885	4	Own	2-6 x 7	Ker.	2
Allwork...2-G	14-28	1775	4	Own	4-4 1/2 x 6 1/2	GorK	3	Hart-Parr...30	30	1295	4	Own	2-6 1/2 x 7	K, D.	3	Rex.....	12-25	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3
Allwork...C	14-28	1525	4	Own	4-5 x 6	GorK	3	Heider.....D	9-16	870	4	Wauk.	4-4 1/2 x 6 1/2	G, K	2	Russell.....	12-24	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3
AndrewsKinD.	18-30	2400	4	Clim.	4-5 x 6 1/2	GorK	4	Heider.....C	12-20	905	4	Wauk.	4-4 1/2 x 6 1/2	G, K	3	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4
Appleton...	12-20	1500	4	Buda	4-4 1/2 x 5 1/2	G, K	2-3	Heider...Cult	6-10	1050	4	LeR.	4-3 1/2 x 6 1/2	Gas.	1	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5
ARO 1921-22	3-5	495	4	Own	1-4 1/2 x 5	Gas.	1	Hicks...	20-30	...	4	Wauk.	4-4 1/2 x 6	K or G	4	Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10
Aultman-T...	15-30	2200	4	Clim.	4-5 x 6 1/2	G, K	4	Huber Light 4	12-25	1185	4	Wauk.	4-4 1/2 x 6 1/2	G or K	3	Samson...M	10-20	445	4	Own	4-4 x 5 1/2	G, K	2
Aultman-T...	22-45	3420	4	Own	4-5 x 6 1/2	G, K	6	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3	Sandusky...J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G, K, D	2
Aultman-T...	30-60	4500	4	Own	4-7 x 9	G, K, D	8-10	Illinois, Super	15-30	...	4	Clim.	4-5 x 6 1/2	G, K	4	Sandusky...K	15-35	1750	4	Own	4-5 x 6 1/2	G, K, D	4
Automot. B-3	12-24	1785	4	Here.	4-4 x 5 1/2	Gas.	2-3	Imperial...C	40-70	4500	4	Own	4-7 1/2 x 9	G, K, D	10	Shawnee Com.	6-12	...	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1
Avery, SR, Cul.	5-10	...	3	Own	4-3 x 4	G, K	2	Indiana...F	5-10	895	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Shawnee Com.	9-18	...	2	Gray	4-3 1/2 x 5	...	...
Avery...Cult-C	5-10	...	3	Own	6-3 x 4	G, K	2	International	8-16	7670	4	Own	4-4 1/2 x 5	G, K, D	2	Shelby...	4-15	...	4	Beav.	4-15 x 6	G, K	3
Avery...B	5-10	...	4	Own	4-3 x 4	G, K	2	Internat. 15-	10-20	7700	4	Own	4-5 1/2 x 8	G, K, D	3	Shelby...C	9-18	...	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2
Avery...C	5-10	...	4	Own	6-3 x 4	G, K	2	Internat. 15-	15-30	1500	2	Own	4-4 1/2 x 6	G, K, D	3	Short Turn...	20-40	1500	3	Beav.	4-4 1/2 x 6	G, K	3
Avery...	8-16	...	4	Own	2-5 1/2 x 6	G, K, D	2-3	J-T...N	20-40	...	2	Chief.	4-4 1/2 x 6	G, K, D	3-4	Steady Pull...	12-24	1485	4	Own	4-4 x 5	Gas.	3
Avery...	12-20	...	4	Own	4-4 1/2 x 6	G, K, D	3-4	Knudsen 1920	25-45	2500	4	Own	4-4 1/2 x 6 1/2	Gas.	4-6	Stinson...4E	18-36	1835	4	Beav.	4-4 1/2 x 6	G, K	4
Avery...	12-25	...	4	Own	4-4 1/2 x 6	G, K, D	3-4	LaCrosse...M	18-32	1475	4	Clim.	4-5 x 6 1/2	...	1	Stone...	20-40	2250	4	Beav.	4-4 1/2 x 6	G, K	4
Avery...	14-28	...	4	Own	4-4 1/2 x 6	G, K, D	3-4	LaCrosse...G	12-24	985	4	Own	2-4 x 6	G, K	1	Toga...	15-27	2625	4	Wise.	4-4 1/2 x 6	Gas.	3-4
Avery...	18-36	...	4	Own	4-5 1/2 x 6	G, K, D	4-5	Lauson...5	12-25	1495	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Topp...	30-45	3500	4	Wauk.	4-4 1/2 x 6 1/2	Gas.	3-4
Avery...	25-50	...	4	Own	4-6 1/2 x 7	G, K, D	5-6	Lauson...20	15-25	1685	4	Beav.	4-4 1/2 x 6	G or K	3-4	Toro Cultivator	6-10	...	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Avery...	45-65	...	4	Own	4-7 1/2 x 8	G, K, D	8-10	Lauson...21	15-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4	Townsend...	10-20	895	2	Own	4-6 1/2 x 7	Ker.	2-3
Bates...	15-25	...	4	Own	4-4 1/2 x 6	Ker.	3	Lauson Road	15-30	2225	4	Beav.	4-4 1/2 x 6	K	3	Townsend...	15-30	1485	2	Own	4-7 x 8	Ker.	3-4
Bates Mule, H	15-25	...	4	Midw.	4-4 1/2 x 6	Gas.	3	Leader...B	12-18	1095	4	Own	2-6 x 6 1/2	G, K, D	2-3	Townsend...	25-50	2750	2	Own	4-8 1/2 x 10	Ker.	4-8
Bates Mule, F	18-25	...	2	Midw.	4-4 1/2 x 6	Gas.	3	Leader...M	16-32	1985	4	Clim.	4-5 x 6 1/2	G, K	3-4	Traction Motor	40-50	...	4	...	8-3 1/2 x 5	Gas.	4-5
Bates Mule, G	25-35	...	2	Midw.	4-4 1/2 x 6	Gas.	3	Leader...GU	18-36	2775	2	Clim.	4-5 x 6 1/2	G, K	3-4	Traylor...TB	6-12	715	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2
Beeman...G	2-4	315	4	Own	1-3 1/2 x 4 1/2	Gas.	...	Leonard...E	20-30	2530	4	Buda	4-4 1/2 x 6	G, K	3	Triumph...H	13-36	2450	2	Erd.	4-4 1/2 x 6	Ker.	4
Best...	18-30	3100	2	Own	4-4 1/2 x 6 1/2	G, K, D	8-9	Linn...H4J	40-...	4500	...	Cont.	4-4 1/2 x 5 1/2	Gas.	4	Trundar...A	25-40	3750	2	Wauk.	4-5 x 6 1/2	G or K	4
Best...	60	5450	2	Own	4-6 1/2 x 8 1/2	G, K, D	8-9	Linn...W	60	5100	...	Wauk.	4-5 x 6 1/2	Gas.	6	Turner...1921	12-25	1295	4	Buda	4-4 1/2 x 6	G, K	3
Boring...1921	1850	3	Wauk.	4-4 1/2 x 5 1/2	GorK	2	Little Giant, B	16-22	2200	4	Own	4-4 1/2 x 5	K	4	Twin City...	12-20	1590	4	Own	4-4 1/2 x 6	G, K	3	
Burn-Oil, 1922	15-30	1495	4	Own	2-6 1/2 x 7	Ker.	3-4	Little Giant, A	2														

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Harrisburg, Pa.	Automobile Show	March
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Madison, Wis.	Automobile Show	March
San Antonio	Automobile Trades Assn.	March
Youngstown	Youngstown Dealers' Assn.	Mar. 4-11
Brooklyn	Eleventh Annual Show	Mar. 4-11
Saginaw, Mich.	Michigan Automotive Trade Assn.	Mar. 6-10
Warren, Pa.	Automobile Show	Mar. 6-11
Camden, N. J.	Automobile Trade Assn.	Mar. 6-11
Indianapolis	Annual Automobile Show	Mar. 6-11
Nashville	Nashville Automobile Trades Assn.	Mar. 6-11
Yonkers, N. Y.	Automobile Show	Mar. 6-11
Wilmington, Del.	Wilmington Trade Assn.	Mar. 6-13
Fairmont, W. Va.	Automobile Show	Mar. 7-10
Newburgh, N. Y.	Automobile Show	Mar. 8-11
Rockford, Ill.	Automobile Show	Mar. 8-11
Amarillo, Tex.	Automobile Show	Mar. 10-11
Antigo, Wis.	Automobile Show	Mar. 10-12
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Spartanburg, S. C.	Piedmont Exposition	Mar. 13-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Great Falls, Mont.	Automobile Show	Mar. 13-18
Greensboro, N. C.	Automobile Show	Feb. 14-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Logansport, Ind.	Automobile Show	Mar. 16-18
Torrington, Conn.	Automobile Show	Mar. 20-25
White Plains, N. Y.	Automobile Show	Mar. 20-25
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Denver, Colo.	Automobile Show	Mar. 22-25
Herkimer, N. Y.	Automobile Show	Mar. 23-25
Kingston, N. Y.	Automobile Show	Mar. 23-25

Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Wash'ton, City of	Automobile Trade Assn.	Mar. 25-Apr. 1
Jacksonville, Ill.	Automobile Show	Mar. 27
Oklahoma City	Automobile Show	Mar. 27-Apr. 1
Torrington, Conn.	Automobile Show	Mar. 27-Apr. 1
Ben. Harb., Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Quincy, Ill.	Automobile Show	Mar. 28-Apr. 1
Bridgeport, N. J.	Automobile Show	Apr. 1-8
Bat. Creek, Mich.	Michigan Automotive Trade Assn.	Apr. 2-8
New York City	Electric Automobile Show	Apr. 3-15
Holdrege, Neb.	Automobile Show	Apr. 5-8
Sioux Falls, S. D.	Automobile Show	Apr. 5-8
Buffalo, N. Y.	Motors and Sportsmen's Show	Apr. 10-15
Wins. Salem, N. C.	Automobile Show	Apr. 11-17
Goldsboro, N. C.	Automobile Show	Apr. 18-22
Chicago	Used Car Show	Apr. 26-May 4
Hartford, Conn.	Automobile Show	Sept. 4-9

FOREIGN SHOWS

London, England	Automobile Show	Feb. 6-11
Santiago, Cuba	Annual Automobile Show	March, 1922
Mexico City	Automobile Show	Apr. 16-23
Rio de Janeiro	Automotive Exhibition	Sept., 1922

CONVENTIONS

Wichita, Kans.	Threshermen's Convention	Feb. 21-24
Decatur, Ill.	3rd Annual Convention, Illinois Automotive Trade Assn.	Mar. 20
W. Sulphur Spgs., W. Va.	S. A. E. Summer Meeting	June 20-24
Olympia	Washington Automotive Trade Assn.	July 21-22

RACES

Indianapolis	500-Mile Classic	May 30
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

REPORT GUY ENGINE SALE

Detroit, March 5—Frank L. Klingensmith and his associates in the Gray Motor Corp. are reported to have acquired control of the Guy Disc Valve Engine Co. of Ypsilanti, which formerly was a part of the Apex Motor Corp., manufacturers of the Ace car. Originally the Apex company made both car and the engine but because of lack of manufacturing facilities its plant was used exclusively for making the car which was equipped with a Continental engine.

The original plan was to manufacture the Guy engine in two types, one of four cylinders and one of six. It now is believed that the four will be used for the Gray car and the six for the Ace and the new taxicab which will be built by Klingensmith and his associates. Harry T. Hanover, president of the Apex Company, is understood to be interested in the taxicab corporation.

COOK HEADS ILLINOIS CLUB

Chicago, March 3—R. C. Cook, president of the R. C. Cook Co., distributor for Velle, King and Fiat cars in Chicago territory, has taken office as president of the Illinois Automobile Club. He was unopposed at the recent election. Richard H. Lee, vice president of Lord & Thomas, is vice president of the club, David Rosenbach, secretary, and Samuel Kraus, Chicago manager of Stewart-Warner Speedometer Corp., treasurer.

The directors are: H. M. Allison, Frank Flynn, L. D. Hemmen, H. D. Jackson, O. D. Jennings, S. J. Kilbourn, George E. Mason, John Nicol, Henry T. Paulman, Ward S. Perry, J. D. Schaffer and Oliver G. Temme.

KELLEY TIRE TO BE SOLD

New Haven, Conn., March 3—As receiver for the Kelley Tire & Rubber Co. of West Haven, Attorney Albert H. Barclay of this city today petitioned Judge George E. Hinman of the superior court here for authorization to expend \$500 in advertising the concern's assets for sale. Efforts to reorganize the company have now been abandoned and the receiver will attempt to dispose of the plant and fixtures to the highest bidder, indicating that there is little likelihood that many stockholders throughout the state will get anything out of the proceeds.

KEARNS-DUGHIE LOWERS PRICE

Danville, Pa., March 3—The Kearns-Dughie Motors Corp. announces a reduction in its model H one-ton chassis from \$1600 to \$1150 and its model M two-ton chassis from \$2200 to \$1650. The price of its model H chassis complete with its standard handmade post express body is \$1350.

CHICAGO TRADES DINNER

Chicago, March 3—The Chicago Automobile Trade Assn. has announced that its annual dinner will be held at the Con-

gress Hotel, 6:30 P. M., March 13. Only 350 tickets will be issued for this dinner and each member of the association is given the privilege of buying three. At this dinner the annual election of officers will be held.

PACKARD TRUCK SALES INCREASE

Detroit, March 3—The Packard Motor Car Co. is selling about 25 per cent more trucks than in the same period last year. Among the purchasers are large business organizations which have just come into the market and a substantial truck replacement business is expected by Packard this year. There also are indications of an increased demand for trucks in highway construction as well as in the passenger transport business.

BUCKEYES AFTER MEMBERS

Columbus, Ohio, March 3—The Ohio Automotive Trade Assn., which has headquarters in Columbus, has launched a vigorous campaign for members. Maurice J. McMeen, of Columbus, has been employed by Secretary E. J. Shover as field secretary.

CHRYSLER AT PALM BEACH

New York, March 5—Walter P. Chrysler has not yet made any announcement of his plans for the future. He left last week for Palm Beach. W. C. Durant also is at the Florida resort. It is not considered probable that Chrysler will join forces with Durant Motors.